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THE MONTH

The Symposium

In 1959, the infant mortality rate for England and Wales reached the record low figure of 22.2 per 1000 live births. There are, however, no grounds for complacency when it is realized that in Sweden the rate was 16, whilst in The Netherlands it was only 17. The neonatal mortality rate also reached a record low level in 1959—15.9 per 1000 live births, but the rate for children aged between three and six months remained constant at 2.1 per 1000 live births for the second successive year, whilst that for children aged between six and twelve months rose slightly—to 1.8. As the chief medical officer to the Ministry of Health modestly points out, 'there is still room for improvement here . . . The position will require careful watching'. And who better qualified than the family doctor to keep watch?

It is against this background that our symposium this month—on 'The First Month of Life'—should be considered. Priority is given to prematurity which, with a neonatal mortality rate of 3.81 per 1000 live births, is the commonest cause of death in this critical period of life, and not so very far behind comes congenital malformation, with a neonatal mortality rate of 2.84. Gastroenteritis, which has a neonatal mortality rate of only 0.06 per 1000 live births, is no longer the dread disease it once was. How much of this improvement is due to improved therapy, and how much to increasing mildness of the disease, may be problematical, but persisting vigilance is obviously required if the condition is to be kept under control. The articles dealing with these, and other problems of the first month of life, provide an authoritative and up-to-date review of the subject, and of what the family doctor can do to ensure that the maximum number of the infants committed to his care successfully negotiate their initiation to the hard facts of modern life.

The First Year of Life

Pædiatricians, school medical officers and social workers have all had their say about the first year of life, but little has been heard from the general practitioner on the subject. This gap in our knowledge has recently been filled by N. J. Cook (*Med. Offr*, 1960, **104**, 219), who describes himself as a general practitioner pædiatrician. His report is based on the individual records of 222 boys and 202 girls, who were under the care of his practice for the first

year of their lives and saw no other general practitioner during this period. His findings may be slightly 'biased' in so far as his practice runs a weekly infant welfare clinic, to which mothers are encouraged to bring their babies fortnightly up to the age of 6 months, and then every three or four weeks until their first birthday, but his report is worthy of careful consideration.

The average number of illnesses was 4.25 for boys and 4.03 for girls—a difference which is not significant. On the other hand, there was a highly significant difference between the average number of visits for boys (4.36) and for girls (3.81), suggesting that baby boys have more serious illness than baby girls. Diseases of the respiratory system were by far the commonest, being responsible for 52 per cent. of all cases recorded. Next in order came disorders of the nervous system and special senses (15 per cent.), of which there were 260 cases, including 113 cases of otitis media and 132 of conjunctivitis and lacrimal duct obstruction. The third group of diseases were those of the digestive system (11 per cent.), which included 90 cases of diarrhœa and 24 of teething, followed by skin diseases (9 per cent.) which included 42 'septic' conditions, 52 cases of napkin rash, and 18 of infantile eczema. There was no case of pyloric stenosis, one of intussusception, and two mongols. The heaviest incidence of illness was in January, with twice as many in the three months, December to February, as in the period, June to August. The seasonal variation was almost entirely accounted for by the varying incidence of respiratory, ear and eye diseases. In contrast the specific infections of childhood were more common in summer. It has previously been reported that the incidence of infection is higher in babies born in June than in those born in December, but there was no evidence in Cook's figures to confirm this, or suggest that there is any advantage for a baby to be born at any particular time of the year.

Mental Health Services

As a recent P.E.P. planning broadsheet ('Community Mental Health Services', price 2*s.* 6*d.*) points out, 'if the letter of the new law [i.e. the Mental Health Act, 1959] is interpreted in the spirit of the recommendations of the Royal Commission on the law relating to mental illness, it will strengthen the trend, which can already be seen in some areas, towards community rather than institutional care of the mentally ill and subnormal'. It is these trends that are responsible for two of the many interesting sets of figures quoted in the broadsheet. Thus, during the last decade, whilst the number of mental hospital admissions in England and Wales has increased from 56,000 to 95,000, the proportion of compulsory admissions has declined from 40 per cent. to 12 per cent. Equally significant is the fact that in the first ten years of the National Health Service the number of new cases seen annually at psychiatric outpatients in England and Wales rose from 93,000 to 160,000.

If, however, the mentally ill are to be returned to the care of the community—as is their right—then the community, in the form of the public, their relatives and their family doctors, will need to face up to the prospect of taking more active steps towards this end than they have done in the past. Some of the problems involved are admirably summed up in a recent study summarized in this P.E.P. broadsheet. This is based upon an investigation of the experiences after discharge of some 500 former patients of a group of Scottish mental hospitals. The most disturbing features of this survey are that only one patient in five had had an outpatient consultation within four weeks of leaving hospital, and that only one-half of them were employed on a full-time basis at the time of the follow-up survey. If these figures are at all representative of the country as a whole—as they probably are—much remains to be done if community care of the mentally ill is to be more than a catch-word of the politicians. On the other hand, it is comforting to know that only about two patients in every ten were responsible for 'any significant curtailment or restriction of the activities of other members of their households'. An interesting point brought out by this Scottish survey is that 'lack of emotional support or positive rejection was found twice as frequently among married men as among either married women or single men'.

Noise and Fertility

In this noise-ridden world the family doctor may well wonder what are the implications for the prospective parents in his practice of the statement that 'auditory stimuli induce infertility and interfere with the course of established pregnancy'. The statement is taken neither from the lay press nor the effusions of one of the many faddists in our midst but from the conclusions of an article by Bernhard Zondek and I. Tamari (*Amer. J. Obstet. Gynec.*, 1960, **80**, 1041). Their evidence, based upon experiments in rats, certainly appears to justify this dogmatic statement.

In a group of 10 mating couples, for instance, exposure to auditory stimuli for fourteen to sixteen days reduced the fertility rate from 80 per cent. to 5.7 per cent., and the number of offspring to 5.9 per cent. of the control rate. Even when the exposure to auditory stimuli was reduced to four days, the fertility rate was reduced from 70 per cent. to 7.1 per cent., and the number of offspring to 3.3 per cent. of the control rate. The fertility of both females and males exposed to audiogenic stimuli proved to be impaired. In one experiment, for instance, the fertility rate in both males and females was reduced to 12.5 per cent. The effect upon the course of pregnancy is illustrated by the fact that when 20 rats were exposed to auditory stimuli from the eighth to the tenth day after mating, only one pregnancy (with 10 fœtuses) resulted, compared with 16 pregnancies (with 125 fœtuses) in a comparable control series. How these effects upon fertility and pregnancy are achieved is still obscure, but other experiments quoted in the report indicate that stimulation of the acoustic nerve stimulates the anterior

pituitary gonadotrophic function—as manifested by prolonged or persistent œstrus, enlargement of the ovaries, and increase of the corpora lutea in number and size. Whatever the cause, the question must inevitably arise as to whether there is any correlation between the rat and man in his, or her, reaction to noise so far as fertility and pregnancy are concerned.

Wesleyan Medicine

NOT the least of John Wesley's claims to fame is his best-seller, 'Primitive Physic' which, first published in 1755, had reached its twenty-third edition by 1791. That an ecclesiastic should produce a medical best-seller was not so surprising in the 18th century as it would be today. Then doctors were few and far between and as often as not the local padre was consulted on problems of physical, as well as spiritual, sickness. In the case of Wesley, there was the further fact that, in his own words, 'for six or seven and twenty years' he 'had made Anatomy and Physic the diversions of [his] leisure hours'. His book, a reprint of which has just been published with an introduction by A. Wesley Hill, M.B. (The Epworth Press, 12*s.* 6*d.*) is packed full of common sense and is much more in line with modern practice than the teachings of his contemporaries. He did at least give Nature a chance to effect a natural cure. This might be described as his first principle. His second principle is best summed up in his own words (and italics): 'I have once more ventured to recommend to men of plain, unbiassed reason, such remedies as air, water, milk, whey, honey, treacle, salt, vinegar, and common *English* herbs, with a few foreign medicines, almost equally cheap, safe and common. And this I have done on that principle, whereby I desire to be governed in all my actions, "*Whatsoever ye would that men should do unto you, the same do unto them*" '.

Take, for instance, some of his 'rules of health'. 'Nothing conduces more to health, than abstinence and plain food with due labour'. 'A due degree of exercise is indispensably necessary to health and long life'. 'Walking is the best exercise for those who are able to bear it; riding for those who are not'. 'The studious ought to have stated times for exercise'. His therapy may be rather more bizarre by modern standards, but infinitely preferable to the drastic measures popular among the qualified doctors of the day. For an ulcer in the urethra his remedy is 'take a clove of garlick, morning and evening', whilst for jaundice he prescribes the wearing of celandine leaves upon and under the feet. On the other hand, what pædiatrician today would dissent from this advice for children: 'Let them go bare-footed and bare-headed till they are three or four years old at least'. Equally acceptable today is his advice for chilblains ('wear flannel socks') and 'to increase milk' ('drink a pint of water going to bed; or, drink largely of pottage made with lentils'). Wesley had obviously summed up the physical, as well as the spiritual, needs of his fellow-countrymen.

THE PREMATURE INFANT

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'Sent before my time into this breathing world, scarce half made up'. (Shakespeare, *Richard III*).

A PREMATURE infant is one born too soon but, as fœtal age is often difficult to determine accurately, the definition used in Britain since 1938 has been that subsequently recommended by the World Health Organization (1950): 'An immature infant is a live-born infant with a birth weight of 5 pounds 8 ounces (2,500 grammes) or less, or specified as immature'. This birth weight standard indicates the need for 'special care', which can be defined as more medical and nursing attention than is usually afforded to the normal new-born infant but, using this criterion, some discrepancies are inevitable. Classified as 'premature', for instance, may be one of twins, the wizened full-term infant resulting from pre-eclamptic toxæmia with severe placental insufficiency, and the large number of small mature babies born in under-developed areas of South-East Asia, whilst excluded are the large, immature infants of diabetic mothers.

Factors affecting birth weight include multiple pregnancy, sex (females average 4 ounces [113 g.] in birth weight less than males), genetic factors, maternal height and age, birth order, placental adequacy, maternal and fœtal disorders, and socio-economic factors including illegitimacy.

HANDICAPS OF THE PREMATURE INFANT

The handicap of prematurity is immaturity of important organs and functions. The characteristic features vary with fœtal age, but constantly found are the soft head, often flattened by the weight of the brain, the thin pointed face with orbits too small for the eyeballs, the short thorax in relation to the large and often distended abdomen with low-placed umbilicus, and testicles in the inguinal canals up till the thirty-second fœtal week. Increased permeability and reduced capillary resistance predispose to hæmorrhage and œdema, and the immature capillary network reduces oxygen availability to the tissues. The hæmorrhagic tendency is increased also by deficiency of some blood-clotting factors. Circulatory and respiratory adjustments after birth seem to be more difficult so that pulmonary œdema, myocardial strain and cardiac irregularities are relatively common.

The most important problem of immaturity is the maintenance of adequate respiration. Whilst the nervous mechanism is adequate after twenty-eight weeks' gestation, the lungs themselves may not be sufficiently developed and aeration through the very small bronchioles is easily prevented by secretions. The poorly developed thorax cannot maintain the excursion required to keep the lungs expanded so that hypoxia and exhaustion result.

The lack of cough reflex up till forty weeks' maturity allows easy inhalation of food or vomit. All babies of less than thirty-six weeks' gestation have periodic or Cheyne-Stokes type of respiration with periods of apnœa of one to two minutes' duration during the first two weeks.

Physiological anæmia of prematurity develops at 6 to 10 weeks, the severity and duration being often proportional to immaturity, so that hæmoglobin values as low as 50 to 60 per cent. are seen in the most immature. Spontaneous recovery occurs towards the end of the third month. As immature bone marrow does not respond to normal stimuli for erythropoiesis, hæmatinics are useless and blood transfusion may depress marrow activity. Increased blood formation in the fourth month is often followed by iron-deficiency anæmia as the small fœtal iron stores are depleted early.

Food requirements are high, and estimated as at least 60 to 80 calories/pound (175 calories/kg.) body weight per twenty-four hours. Rapid growth as well as inadequate fœtal stores leads to deficiency of vitamins and mineral salts, especially iron, unless extra supplements are fed from an early age.

Mechanical feeding problems result from the poor muscle tone of the alimentary tract and immaturity of the sucking and swallowing reflexes, which are not developed until thirty-five weeks' fœtal age and are easily depressed by birth stress. Thus regurgitation, abdominal distension and constipation are important hazards. Digestive functions are fairly adequate, although absorption of cows' milk fat may be deficient for some weeks.

Physiological jaundice occurs when the rate of bilirubin formation exceeds the capacity of liver enzymes to conjugate it into glucuronides for excretion in the bile. The rise in plasma bilirubin is inversely proportional to fœtal age and the maximum may not be reached until the sixth day in the most immature infants. Unconjugated serum bilirubin above 20 mg. per cent. is toxic to brain cells, particularly in the basal ganglia and nuclei of the floor of the fourth ventricle, resulting in either death or permanent damage with the sequel of kernicterus, often with deafness and aphasia. Some drugs, including synthetic vitamin K intramuscularly in large or repeated doses, and sulphonamides, depress this enzyme activity and should only be prescribed for the mother in premature labour or for the new-born infant in exceptional circumstances.

Instability of body temperature is due to poor muscular activity, absence of shivering and inadequate development of the cutaneous sweating mechanism which makes adjustment to changes in environmental temperature difficult. Heat production is low in the early days and heat loss is increased by the large body surface area and lack of subcutaneous fat.

Immaturity of renal function causes problems of acid-base balance and electrolyte excretion. As a high-salt intake causes œdema, normal saline should never be given to a premature infant unless there has been serious salt depletion. The high-salt content of cows' milk as compared with human milk, causes rapid weight gain and œdema if large amounts are fed.

The nervous system is the most immature at premature birth. The 'frog

position' is often adopted, the head cannot be lifted even momentarily from the prone or supported sitting posture, and the most immature babies often exhibit spontaneous jerking movements of the limbs and attempts at crawling and rolling. Many of the reflexes such as the Moro or 'startle' reflex, the tonic neck reflex, blink, yawn, sneeze and grasp reflexes are present from at least the twenty-eighth fœtal week.

The eyes show characteristic features of immaturity, including persistent hyaloid arteries, lack of myelination of the optic nerve, sometimes a high degree of myopia, and poorly pigmented choroid. The immature retinal vessels are hypersensitive to increased oxygen concentrations; retrolental fibroplasia is a definite risk with oxygen concentrations over 35 per cent.

Resistance to infection is poor, owing to diminished placental antibody transference and low plasma gamma globulin.

PLAN OF CARE

This requires the closest collaboration between doctor and midwife. If the pregnancy is of less than thirty-seven weeks' duration, the infant has the best chance of survival if born and nursed in a hospital where there is a premature baby unit. The child born at home who weighs less than 4 pounds (1.8 kg.), or who has any problems, should be transferred to hospital in a heated carrier with oxygen, and accompanied by an experienced nurse.

For home care the following criteria should be fulfilled: (1) a warm room for exclusive use of mother and baby, (2) absence of infection in the household, (3) sufficient skilled nursing care for the baby, (4) satisfactory domestic help, (5) suitable draught-proof cot and other equipment. Many local health authorities now employ midwives with special training for premature baby care, and loan equipment.

Hazards to the immature infant from infection, hypoxia and mechanical trauma, may be avoided by skilled management of labour and suitable preparation for delivery. The precautions to be taken include detection and treatment of maternal infection; the administration of prophylactic tetracycline if membranes have been ruptured for more than twenty-four hours; and minimal analgesia, with avoidance of combinations such as pethidine and nitrous oxide. Episiotomy and vertex delivery with low forceps reduce delay in the second stage, and thereby the risks of mechanical trauma on the easily moulded fœtal skull, and intracranial vascular congestion. Establishment of respiration, avoidance of infection and prevention of heat loss are the three first essentials for care after birth. Preparations include a room heated to at least 70° F. (21° C.), a draught-proof cot heated to 85° F. (29.5° C.), and warm sterile or clean towels to wrap round the baby. Oxygen, mucus catheters and a double polythene tube for intragastric oxygen should be available.

IMMEDIATE CARE AFTER BIRTH

Strict aseptic technique should always be observed and an efficient mask and gown should be worn when handling the baby.

The infant is wrapped in a warm sterile towel; the head is kept low and the cord is ligated as soon as pulsation ceases, this ensures the retention of at least 30 millilitres more blood than after immediate ligation. The child is then placed on the right side in the warm cot and the mouth and stomach are aspirated. If respiration is not immediately established resuscitation with oxygen by plastic funnel, pharyngeal or intragastric catheters should be begun. Forcible attempts at artificial respiration are always dangerous. As soon as respiration is well established, the eyelids are swabbed with sterile gauze and the baby is weighed and transferred to another clean, warm towel and should not be bathed. The trunk is dusted with powder containing hexachlorophane (1 per cent.) and the cord stump is wrapped in a sterile gauze swab. The temperature of cot and baby are checked and the colour, respiration and peripheral pulse or apex heart rate are noted. Because of its harmful effect on the eyes, oxygen should not be continued unless there is definite evidence of hypoxia.

In incubators, nursing naked in the prone position is often practised. In the open cot the child is wrapped in a loose woollen wrapper and bonnet, kept on the side and turned two-hourly, but all tight wrapping or heavy blankets should be avoided. The cot temperature is maintained by frequently refilling hot water bottles.

During the next twelve hours the child should be under close observation for adverse signs such as irritability, twitching, œdema, cyanosis or respiratory distress, as denoted by grunting and an increased respiration rate to 60 per minute or more. Oral fluid should be withheld, as there is great danger of regurgitation and inhalation pneumonia. One dose (1 mg.) of synthetic vitamin K intramuscularly probably improves blood clotting although opinions differ about the necessity for this.

The buttocks are cleaned with an antiseptic lotion, such as 1:10,000 benzalkonium chloride, as oils encourage bacterial growth. The following technique has proved successful in prevention of bacterial growth on the umbilicus. At eight hours after birth, the umbilical cord is cut to ¾ inch (2 cm.) from the skin, and sprayed with plastic dressing. This stump, and the skin of the trunk, perineum and groins are powdered with hexachlorophane dusting powder each time the napkin is changed.

SUBSEQUENT CARE

The environmental temperature is adjusted according to the infant's need. Body temperature is recorded at least twice daily; a very gradual rise for a baby of 36 to 40 weeks up to 96° to 97° F. (35.5° to 36° C.) during the first four days, and to 98° F. (36.75° C.) by the time full caloric feeds are taken is the aim. Higher temperatures or a rapid rise after birth and wide fluctuations are undesirable. High air humidity helps to conserve body water during the period of minimal fluid intake. In a small room, wet bath towels or a pan of water near the fire are adequate.

FEEDING

Correct administration of feeds is the most important skill of the trained premature baby nurse. Most infants of less than thirty-five weeks' fœtal age require gavage feeding; spoon or pipette feeding may be very dangerous in the child who cannot suck or swallow properly. Three- or four-hourly feeding intervals are usually satisfactory, but the indwelling polythene catheter is valuable for smaller infants who may only tolerate two-hourly feeding. More mature infants should be nursed entirely in their cots at first to maintain warmth, and breast feeding is often postponed until the fourth day, unless the baby is very vigorous; to avoid unnecessary early weight loss and lethargy some bottle feeds are given to most babies. Regular expression of the mother's breasts is important, and when breast feeding is first attempted test-weighing is necessary.

The first feed of boiled water or 5 per cent. glucose water (4 to 8 ml. per feed) is given when demanded after the first twelve hours. Subsequent increases should normally only be made once daily and should not exceed 2 to 4 ml. per feed. An average intake of fluid is:—

3rd day: 1 ounce/pound (63 ml. per kg.) body weight/24 hours.
7th day: 2 ounces/pound (125 ml. per kg.) body weight/24 hours (food content, 20 calories per pound [44 calories per kg.]).
14th day: 3 ounces/pound (187 ml. per kg.) body weight/24 hours (food content, 20 calories per pound [44 calories per kg.]).
Subsequent: 3 ounces/pound (187 ml. per kg.) or more according to demand.

The three-hourly feeding interval with eight feeds in twenty-four hours is suitable for most babies, reducing to seven feeds at 5 pounds (11 kg.), but a night feed is usual until the weight is 7 to 8 pounds (14.5 to 17.5 kg.).

Human milk is so well tolerated that it has the strong preference of many pædiatricians, particularly for the more immature infants, although some consider that the protein content is too low. The mortality rate from one month to six months has been shown to be less for breast-fed than artificially fed premature infants. Human milk banks in Britain provide an efficient source of supply in most areas now, although the cost is considerable.

Satisfactory substitutes are half-cream evaporated or dried cow's milks, although the very immature infant often tolerates more modified milks better: e.g. 'frailac' (Cow & Gate), sweetened evaporated milk (1:12 to 1:10 dilution), and 'synthetic milk adapted'. Because of its low protein content when the fat is suitably diluted, liquid cow's milk is a less satisfactory food for the premature infant. Whichever food is selected, it is usual to give the milk diluted to $\frac{1}{4}$ strength at first, gradually increasing to full strength by the 4th to 5th day.

Vitamin supplements in concentrated preparations should be started on the 7th day, with small doses gradually increasing to the following daily dosage by four weeks: vitamin A 4000 to 5000 i.u., vitamin D 800 i.u., vitamin C 50 mg. Vitamin B complex is often advocated up till the weight of 8 pounds (17.5 kg.).

Iron, as ferrous sulphate, $\frac{1}{2}$ grain (30 mg.) thrice daily given in a mixture

with acid and glucose (e.g. ferrous sulphate mixture for infants B.P.C.), or colloidal ferric hydroxide with glucose, 12 minims (0.8 ml.) daily, is started at four weeks and continued through the first year.

SPECIAL DISORDERS

Congenital malformations occur at least six times more often than in full-term births and are the third highest cause of perinatal mortality.

Intracranial birth trauma is common in the premature infant owing to the soft, easily moulded skull, fragile tissues, and the high incidence of precipitate vertex and breech delivery, and hæmorrhage is increased often by fœtal hypoxia. Intraventricular hæmorrhage is a characteristic terminal event in premature infants after severe respiratory disturbances. These disorders often present as respiratory difficulty with grunting, or long periods

Weight*	Proportion per 100 premature babies	Number	Deaths in 24 hours		Survivors at 28 days	
			Number	Per-centage	Number	Per-centage
– 3 pounds 4 ounces or 1,500 g.	11	5,661	2,543	45	1,876	33
– 4 pounds 6 ounces or 2000 g.	18	9,228	862	9	7,542	82
– 4 pounds 15 ounces or 2,250 g.	20	10,160	319	3	9,456	93
– 5 pounds 8 ounces or 2,500 g.	51	25,693	400	1.6	24,644	96
All cases	100	50,742	4,124	8	43,518	86

TABLE I.—Showing deaths within twenty-four hours and survivors at twenty-eight days by weight groups of notified premature live births in England and Wales, 1958.

* The minus sign of the weight group is to be interpreted as follows:—'– 3 pounds 4 ounces' means up to and including 3 pounds 4 ounces, '– 4 pounds 6 ounces' means over 3 pounds 4 ounces up to and including 4 pounds 6 ounces, and so on.

of apnœa, hyper-irritability, a shrill cry and generalized rigidity or lethargy, inability to suck and swallow, absence of the Moro reflex and increased thermolability. Fontanelle tension increases and the heart rate slows. Death often occurs in the first twenty-four hours in an apnœic attack or convulsions. Cerebral and meningeal œdema is more common than hæmorrhage and follows fœtal hypoxia or severe asphyxia neonatorum. The clinical signs are similar but often develop more slowly, with death or recovery after three days. Minimal handling, and sedation with chloral, 1 grain (60 mg.), or phenobarbitone, $\frac{1}{8}$ grain (7.5 mg.) six-hourly, are essential. Lumbar puncture is of doubtful value except to reveal subarachnoid hæmorrhage. If there is no vomiting, 10 per cent. glucose may be given by tube or bottle. Attempts to reduce cerebral œdema with 50 per cent. dextrose solution (5 to 10 ml.) intravenously, or acetazolamide orally, sometimes help. If the fontanelle remains tense exploration for subdural hæmatoma should be attempted.

Respiratory distress in the first three days accounts for one-third of premature perinatal deaths. In very immature infants, the lungs never expand properly and signs of respiratory distress, with grunting and rapid respirations, cyanosis and retraction of the sternum, are present from birth. Other infants develop signs within the first two hours which gradually worsen, with cyanosis, generalized œdema and terminal heart failure in forty-eight hours. Auscultation reveals high-pitched breath sounds with poor air entry and fine râles. Post-mortem examination reveals atelectasis with or without the gelatinous material known as hyaline membrane, which blocks the entry to the terminal air sacs. If the infant lives for three days survival is likely. Congenital pneumonia is liable to occur when the membranes have been ruptured for some time before delivery.

Nursing in oxygen (not more than 35 per cent.) preferably in the prone posture, a clear airway, and administration of synthetic digitalis glucosides intramuscularly, 0.025 mg. eight-hourly, to improve cardiac output are the usual methods of treatment. Prophylactic antibiotics are also indicated.

From the third to sixth days the most important hazard is *hyperbilirubinæmia*, which is increased by dehydration. The level of serum bilirubin should be watched in all jaundiced premature infants and a rise to dangerous levels (20 mg. per cent.) is an indication for replacement blood transfusion as for hæmolytic disease of the newborn.

Infection should always be suspected in the infant who suddenly becomes lethargic, pale, anorexic, cold, œdematous, or, less commonly, develops fever. Congenital infections occur when the membranes are ruptured for long before delivery but the greatest hazards are after the first few days. *E. coli* septicæmia with gastroenteritis and terminal meningitis, and staphylococcal sepsis are important. Whenever infection is suspected immediate steps should be taken to establish the diagnosis by full clinical examination, and culture from all possible sites of infection including the cerebrospinal fluid. Treatment with appropriate antibiotics should be started on suspicion of infection but the prognosis of serious infection is always very grave.

PROGNOSIS

Neonatal survival rate is directly proportional to birth weight as shown in table I. The infant mortality rate is also increased and there is a high incidence of infection in the first two years. As might be expected there is a greater incidence of severe brain damage and cerebral palsy among survivors, particularly those of very low birth weight, and some eye defects are also more common, e.g. myopia, squint and cataract. Studies on the long-term progress show a fairly satisfactory picture with subsequent normal development, although many of these children remain underweight for some years. There is also some evidence of slight retardation in acquiring educational skills, e.g. reading, and greater difficulty in making emotional adjustments.

INFANT FEEDING IN THE FIRST MONTH OF LIFE

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INFANT feeding is a simple business for the healthy baby and many of the difficulties that have surrounded the subject have been the creation of doctors, nurses and neighbours. After delivery, particularly if away from her usual surroundings, the mother is vulnerable to criticism; if she can be encouraged to use her initiative while knowing that we are ready to help, she will gain confidence. The wind of change has already achieved a great deal although there is still far too much well-meant interference, with emphasis on the complications and difficulties rather than on the pleasures of feeding a baby.

The general well-being, weight gain and contentment of the infant are the best indication that feeding is satisfactory, but the practitioner must be able to check the quantity and quality of the feed. *Before considering any change, give the baby an opportunity of taking more.* If sufficient is provided as breast milk, or as any one of a number of reliable substitutes, the infant should make normal progress. When these conditions are fulfilled and the baby is not thriving, then there is something amiss with him; frequent changes of feed are unwise since they waste valuable time and focus attention on the feed rather than on the infant.

QUANTITIES

From the beginning of the second week of life the healthy full-term baby requires approximately two-and-a-half fluid ounces per pound of body weight per day (165 ml. per kg.), either in the form of breast milk or its equivalent, and this figure holds good for the first five or six months although modified by the introduction of mixed feeding. During the first week he will usually take less than one-seventh of the total during the first twenty-four hours, two-sevenths in the second and so forth throughout the week. It is important to realize how little he needs during the first few days; many babies are taken off the breast quite unnecessarily because it is thought that there is not enough milk. The needs of premature babies are considered elsewhere in this symposium (Corner, 1961). The quantity of feed can be based on *caloric requirements*, taking 50 calories per pound per day (110 calories per kg.) as roughly the equivalent of two and half ounces per pound per day (156 g. per kg.) and remembering that one ounce (28.5 ml.) of breast milk provides approximately 20 calories, one ounce of reconstituted full-cream dried milk 18 calories, and one ounce of reconsti-

tuted half-cream dried milk 16 calories. One level teaspoonful of sugar gives 15 calories.

If the baby is underweight he will need sufficient for his expected weight before he can both regain what he has lost and start to thrive. All these figures are intended only as a rough guide; many infants require more and some do well on less.

BREAST FEEDING

In addition to the obvious merits of suitability, economy, simplicity and convenience, breast feeding when successfully established leads to a happy relationship between the mother and her child which is very apparent to the observer and to the mother. It is in his almost complete freedom from severe gastroenteritis that the breast-fed baby benefits and this is particularly important when the standards of hygiene are low. There is as yet no clinical evidence that the much higher percentage of volatile fatty acids in cow's milk has any deleterious effect or that babies reared on the bottle have less satisfactory nutrition. Widdowson and her colleagues (1960) showed, however, that breast-fed babies, at least on the sixth, seventh and eighth days after birth, maintained a high urinary excretion of strontium and calcium and that although they were in positive calcium balance they were in strongly negative strontium balance, whilst babies on cow's milk preparations retained strontium, a finding which might have practical implications. Spock, advocating breast feeding, writes: 'On general principles it is safer to do things the natural way unless you are absolutely sure you have a better way', and it is well to bear this in mind.

It must be confessed that the reliability of modern artificial feeds and changing social customs have led to a sharp rise in the number of infants who are taken off the breast within a short time of discharge from hospital. Nevertheless, the majority of mothers in this country are still anxious to breast feed, at least for a few months, and much can be done to help them to succeed.

ARTIFICIAL FEEDING

Many artificial feeds are good and the practitioner is well advised to become thoroughly familiar with one or two, resisting the blandishments of the travellers who offer new, possibly more expensive but not necessarily better, products. Although *modified cow's milk* (boiled) can be quite satisfactory, dried and evaporated preparations are slightly more digestible as regards protein content, are simpler to prepare and less likely to be contaminated.

On the whole, *dried milk powders* are more easily stored and carried and the theoretical disadvantage of a slightly less uniform mixture is unimportant. Half-Cream National Dried Milk is one of many reliable feeds for the first three months of life. One level measure of the powder made up to one ounce with water provides 16 calories per fluid ounce (28.5 ml.) and, if one level teaspoonful of sugar is added to each four ounces (113 ml.) of (reconstituted) feed, provides adequate calories with a slightly reduced fat

content (particularly useful during the first weeks) and used half-strength for the first forty-eight hours. Proprietary dried-milk preparations labelled 'Number 1', 'Half-Cream' (to which sugar has already been added) and 'Humanized' require the addition of water only, in the proportion of one measure of powder to each ounce (28.5 ml.) of feed, and these, too, are used in the first three months. In every case the special measure provided should be used, excess milk powder being removed with a knife-blade.

Evaporated milk.—British and American firms market reliable products in this country but they differ in concentration. A British full-cream evaporated milk requires the addition of 25 fluid ounces (0.7 litre) of water to 15 fluid ounces (0.4 litre) of milk to give the equivalent of cow's milk. During the first days of life 12 fluid ounces (340 ml.) of water and four teaspoonfuls of sugar are added to 6 fluid ounces (170 ml.) of the evaporated milk to prepare a suitable mixture from which to dispense the day's feeds. A half-cream evaporated milk is now available and is useful for small infants. There are also more complicated artificial feeds which aim at the provision of essential amino-acids and unsaturated and saturated fatty acids in the same proportion as in human milk.

Vitamins.—Additional vitamins are not essential in the first month of life but it is wise to introduce ascorbic acid, 25 mg. daily, towards the end of the month. Parents must be reminded that there is a very real risk of vitamin C deficiency unless some reliable preparation is given regularly to the baby on artificial feeds. Vitamins A and D are already incorporated in the various artificial feeds and no additional supply should be added during the first month.

TIME AND DURATION OF FEEDS

Time.—Regimentation of the baby to a rigid time-table was the rule for some forty years and was responsible for much unhappiness and frustration and for many failures in breast feeding. The baby was to be fed by the clock every four hours for twenty minutes, five times a day. Crying in the night was to be treated by changing the napkin and possibly a drink of boiled water. The ritual was so far removed from that of all other (and more successful) mammals that it is scarcely surprising that it led to trouble. Mother and nurse would watch the hungry baby crying himself to sleep some half an hour before the feed was 'due'. At exactly the specified time both attempted to wake him sufficiently to take his feed, but this was not always successful and if he failed to empty the breast the milk supply ceased. If a baby readily adapts himself to a time-table then it is obviously convenient for hospital and home routine, but elasticity must always be allowed.

The majority of infants want a night feed during the first six weeks or more and if this is given they will probably sleep more soundly and allow their parents a longer night. *Demand feeding* is now replacing the strict time-schedule and this is reasonable and an excellent method if the mother can recognize when the baby is hungry. The over-anxious mother may take her responsibilities so seriously that she watches her baby for the least sign

of waking and picks him up for a feed at the first cry: in some cases feeds may be offered almost every half-hour, exhausting both mother and baby. Difficulty also arises if the infant is lethargic or ill and wakes too seldom for a feed. A sensible compromise between the two regimes can be found which will suit the individual family. Illingworth and Stone (1952) have shown how successful demand feeding can be in a maternity hospital.

The *duration* of each feed can be safely left to the baby's choice in most cases, and for the mother who was asked 'how long do you give him at each breast?' and who replied 'till he drops off', breast feeding was not only successful physically but also a particularly happy encounter for them both. During the first two or three days the baby should be offered a feed for a few minutes at approximately six-hour intervals, to allow him and his mother to become acquainted and for him to develop his new skill. Most infants take about twenty minutes when feeding has become established but the mother should offer both breasts at each feed, starting with the right and left alternately, and always allowing longer on the first so that one breast may be emptied each time.

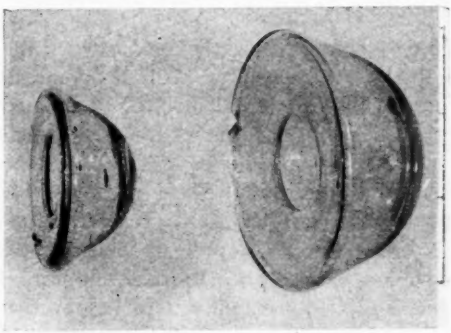

FIG. 1.—Glass nipple shields (Waller). Showing small model to be worn during pregnancy and large model for use after delivery. (Scale in inches.)

DIFFICULTIES ASSOCIATED WITH BREAST FEEDING

Waller (1946) showed how much could be done to overcome the mechanical difficulties associated with *inverted or retracted nipples* by the use of a small glass or plastic shield (fig. 1) worn beneath the brassière during pregnancy; a little pressure is exerted over the areola and surrounding tissue, with the result that the nipple is brought forward through the opening and into the cavity of the shield. Waller also demonstrated that small plugs of dried secretion may block the ducts as they open on to the tip of the nipple, thus preventing the free flow of milk. He advocated gentle expression of secretion during the latter weeks of pregnancy and both these simple procedures have proved valuable. After delivery, when the breasts begin to fill, a critical stage may be reached when skilled advice and encouragement will greatly increase the chances of success.

Engorgement.—Emptying the breast is the stimulus for production of milk but if the breasts become too tense this may be impossible because the nipple is almost submerged in engorged breast tissue. In this situation the infant's efforts to get a firm hold on the nipple are unrewarding for

him, painful for his mother, and liable to damage the nipple; pressure rises in the breast and if it is not relieved there may be a rapid failure of secretion. After delivery the small shield may be replaced by a larger model (fig. 1) which helps to prevent overdistension and engorgement, allowing milk to leak into the shield between feeds. If the breast remains tense, very gentle manual expression can remove sufficient to make it possible for the baby to suck and it is wise to see that the breast is emptied at the end of the feed. The use of stilbœstrol may help by reducing secretion but it is easy to overtreat, with consequent failure in breast feeding; 5 mg. by mouth may be repeated two or three times at four-hourly intervals and in exceptional cases 20 mg. doses may be given.

Cracked nipples may be sufficiently painful to make the mother dread the feed and they are a potential source of infection both to the baby and to the mother. At the first complaint of pain the nipples should be examined minutely; if even a superficial fissure is present the infant should be taken off that breast while manual expression is continued to maintain the secretion. Many local preparations are advised but rest from sucking is the most important factor in treatment.

If any *infection* is present antibiotic ointment may be of value (after a swab has been taken) but in simple cases cleansing and the local application of some preparation such as flavine is probably as useful. Monilia infection can occur and in these cases nystatin ointment is invaluable. Infections of the breast are usually due to staphylococci but other organisms may be responsible. These infections are less likely if there is a free flow from the breast and cracked nipples are avoided. Whenever the incidence of staphylococcal infection rises in the mother's environment the risk of breast abscess increases; infants who may be free of symptoms often harbour staphylococci in the nose or at the base of the cord.

Failure to secrete milk.—A woman who wishes to breast feed may fail to secrete milk; psychological factors are sometimes responsible for lack of success. Unfortunately no reliable galactogogue is available. Care must be taken to prevent her feeling inadequate or guilty of having failed her baby.

DIFFICULTIES ASSOCIATED WITH ARTIFICIAL FEEDING

The teat is the main source of trouble. If an infant takes unusually long or fails to finish his feed, the hole in the teat may be too small. Milk should drip freely when the bottle is inverted and if this does not happen a red-hot needle should be used to enlarge the hole. Confusion sometimes arises between ounces and tablespoons and occasionally a mother will indulge in the wildest guesswork, achieving a watery fluid with little resemblance to the correct mixture. Trouble can occur if the bottle is held horizontally so that the teat is more than half full of air or if prolonged sucking has produced a vacuum in the bottle thus preventing the escape of milk through the teat. All these mistakes can be recognized and treated if time is spent in watching the baby at his feed.

FEEDING DIFFICULTIES ASSOCIATED WITH THE BABY

Local conditions include nasal obstruction associated with infection, best treated by simple non-oily nasal drops, such as tuamine sulphate 0.5 per cent., before feeds.

General conditions.—Difficulty in initiating feeding in the first few days may be the result of *cerebral birth trauma*. If the swallowing reflex is normal, 10 per cent. glucose solution can be given by spoon or pipette for the first two to three days; if there is any risk of choking, tube feeds will be necessary. In congenital heart disease the defects causing cyanosis are easily recognized; some of these babies may suck quite vigorously, but others, and those

FIG. 2.—Starvation in a breast-fed baby: (a) Aged 17 weeks. Weight 1½ ounces (42.5 g.) above birth weight. (b) One week later had gained 26 ounces (0.7 kg.). Treated at home with full-strength complementary feeds.

with defects such as coarctation, may present as feeding problems because the baby has not sufficient reserve to be able to suck for any length of time.

Failure to gain weight on an adequate diet is characteristic of fibrocystic disease of the pancreas (mucoviscidosis) because calories are lost in the bulky, fatty stool.

Refusal of a feed is often the first sign of a severe infection such as pneumonia or meningitis and delay in investigation and treatment may have tragic consequences. Lack of normal appetite with consequent flattening of the weight curve may be the result of a less fulminating disease.

The tense mother is a real problem, particularly when mother and baby have a similar temperament: sympathetic handling and advice, together

with chloral hydrate, ½ to 1 grain (30 to 60 mg.), in a mixture to the baby before feeds may help as a temporary measure until mother and baby have established a satisfactory routine. The gentle art of bringing up the wind is easily demonstrated.

OVERFEEDING AND UNDERFEEDING

Overfeeding is scarcely ever responsible for trouble. The normal baby adjusts intake to appetite and he appears rather to enjoy his belch and regurgitation when he has taken too much. There are still a few conscientious nurses who were trained in the days when almost all a baby's troubles were put down to overfeeding and certainly until very recently the nursery editor of a popular magazine was perpetuating this view. Once the mother has been indoctrinated it is very difficult to remove her anxiety.

Underfeeding is far more likely to cause trouble although it is less often seen today. Test feeding is the only way of discovering how much the baby is taking from his mother and the fact that he seems contented and that a little milk can be expressed after the feed may be misleading.

Y.C., born 8.10.57, was first seen at the age of 17 weeks weighing seven pounds 5½ ounces (fig. 2a). History: First child, birth weight seven pounds four ounces (3.3 kg.). Breast fed, taking ten minutes at each breast five times daily, with additional cod-liver oil and orange juice. The baby had always been contented, slept through the night, and 'sucked well'; bowels open every three days. The mother was a conscientious woman and had studied the books; she had never doubted that she had sufficient milk. On examination the baby showed no abnormality apart from her starvation and made uneventful progress (fig. 2b) on complementary feeds of National Dried Milk.

Test feeds must cover the whole period of forty-eight hours, as one or two feeds may not give a true picture. Accurate scales can usually be borrowed from the local health department and the mother must be reminded that wet and dirty napkins must not be changed between the weight record made before and after the feed. When there is a deficit of perhaps four ounces in the day there is no need to continue test feeding or to make up each feed to a theoretical total by an exact amount of complement. The baby should be given the opportunity to take an additional six or seven ounces in the day and this is best done by allowing him to feed normally from the breast and then offering him an additional two ounces of artificial feed from the bottle after all but the early morning feed. As the infant begins to thrive, tension relaxes and the supply from the breast may increase; the bottle can then be dropped at one or two feeds and finally given up. Mothers (and fathers) readily become addicted to test weighing, with consequent anxiety over the milk production at each feed and it is wise to lend scales for not more than forty-eight hours at a time.

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GASTROENTERITIS IN THE NEWBORN

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GASTROENTERITIS occurring in the neonatal period has sometimes been called *epidemic diarrhœa of the newborn*. This designation should not imply a difference in kind from that seen in older infants. It does, however, focus attention on two important aspects: first, that it is liable to appear in nurseries for the newborn, and secondly, when it does it rapidly assumes epidemic proportions (Macgregor, 1960). Outbreaks in maternity units were often reported between 1940 and 1950, and in some the case mortality was over 50 per cent. Premature infants were especially vulnerable. In recent years, the disease has become less common, doubtless because of improved nursery techniques. The mortality rate also has fallen, although it is doubtful how far this is due to more effective treatment, many clinicians having the impression that the disease itself has become milder. In addition, sporadic cases in infants born at home are not infrequent. Furthermore, the general practitioner must expect to see infants in whom the infection is acquired in hospital but who develop symptoms only after their discharge.

ETIOLOGY

The term, gastroenteritis of the newborn, is used to indicate nothing more precise than an infectious process in which diarrhœa and vomiting are the presenting symptoms. The causes are several, and in some outbreaks have remained undiscovered. In recent years, it has been generally accepted that most severe cases are associated with various specific types of *E. coli*.

Bray (1945) first drew attention to these when he isolated a specific agglutinable member of the *E. coli* group called *Bact. coli var neapolitanum* (B.C.N.) in an outbreak of infantile diarrhœa. The same organism was isolated in other epidemics by Giles and Sangster (1948) who called it 'Alpha', and by Taylor and her colleagues (1949) who called it 'D433'. In 1947, Kauffmann published an antigenic scheme for the *E. coli* group which classified them by their somatic (O), surface (K), and flagellar (H) antigens. This classification is now used by most bacteriologists. One of the varieties of K antigen is labelled B, and it seems to be possessed by all the serotypes of *E. coli* so far associated with gastroenteritis. Bray's original B.C.N. is known in Kauffmann's classification as 0.111 : B4 (Kauffman and Dupont, 1950). At the present time, over a dozen serotypes have been identified from cases of infantile gastroenteritis. Among the most common in this country are 0.111 : B4, 0.55 : B5, 0.26 : B6, 0.119 : B14, and 0.128 : B12. Although full serological investigation involves identification of all three groups of antigen, for routine work it is necessary only to identify the somatic (O) antigen. These agglutinable *E. coli* rarely produce symptoms in older children or adults, who often, however, become carriers (Taylor *et al.*, 1949; Stevenson, 1952).

Whilst the evidence that agglutinable *E. coli* have caused the illness in the infants from whom they have been isolated is highly suggestive it is not yet conclusive. Thus, they have been found in infants' homes and nurseries in the absence of diarrhœa (Payne and Cook, 1950; Taylor and Charter, 1952). Cooper and his colleagues (1959) examined the rectal swabs of 361 mothers and 355 new-born infants in a maternity unit. The surprisingly large number of 46 mothers and 23 infants were found to be harbouring one of eleven serotypes of *E. coli*. A high incidence of diarrhœa was expected, but in a follow-up of three months' duration the incidence of diarrhœa was confined almost exclusively to infants from whom specific *E. coli* had not been isolated during their stay in hospital and from whose mothers these organisms had not been isolated. On the other hand, it is well recognized that high carrier rates with a low incidence of disease are not uncommon with other intestinal pathogens of the Salmonella and Shigella groups. Indeed, members of these groups have been responsible for some sporadic cases and epidemics of diarrhœa in young infants. There is some evidence to suggest that, especially in the neonatal period, certain outbreaks may be of viral rather than bacterial origin (Buddingh and Dodd, 1944; Light and Hodes, 1949).

It is most important that an attempt be made to determine the cause in any single patient or epidemic. Rectal swabs should be sent to the laboratory for culture as a routine. In suitable circumstances fæces and other specimens may be requested for virus studies. The successful isolation of enteropathogenic bacteria such as specific *E. coli* enables the clinician to plan rational antibiotic therapy.

PATHOLOGY

Pathological changes at post-mortem examination are often minimal or absent. Death in infantile diarrhœa is due almost entirely to the severe disturbances of body fluids and electrolytes. The gastro-intestinal tract may show mild inflammatory changes. Pneumonia, hypostatic or due to terminal aspiration of vomitus, commonly supervenes, but suppuration in the middle ear or mastoid, which was a common finding in the pre-antibiotic era, is now rarely seen. The liver may show fatty change but this is less obvious in the newborn than in older infants, possibly because of the more rapidly fatal course of the disease (Macgregor, 1960).

CLINICAL FINDINGS

In the newborn the illness may vary from quite a mild upset to a course so fulminating that the patient dies from dehydration and peripheral circulatory collapse before the first loose stool has been passed. In such cases diagnosis may be impossible without a history of contact with others. It is often wise when the practitioner is faced with an ill new-born infant in whom the diagnosis is not obvious to contact the hospital in which the birth took place. Information that other cases of infection had been recognized there would obviously be most helpful.

In most cases the diagnosis is fairly easy. If daily weighing has been practised the first sign of an infection is an abrupt loss of weight, often up to half a pound (0.2 kg.). The infant becomes reluctant to feed, fretful, and has an anxious expression. There may be low fever, but in severe infections in premature infants a subnormal temperature is more usual. Diarrhœa is the earliest indication of the site of infection. The stools are liquid, often large in volume, at first yellow but subsequently grass-green. They are passed frequently and often explosively. The peri-anal skin may become red and excoriated. Blood and mucus are rarely seen. Vomiting is usual but not invariable. It may be of such severity as to make oral treatment impossible. Oliguria is invariable but often escapes notice, especially if the infant becomes ill at home. Tachycardia is usually marked (over 160 per minute). Occasionally jaundice develops.

The most striking and important signs, in all but the mildest of cases, are those due to dehydration. Their accurate assessment is imperative because dehydration is the real danger to life. It is helpful to consider three degrees of severity (Medical Research Council, 1952) as it is on this basis that the practitioner should decide whether to treat the patient at home or to arrange admission to a pædiatric unit.

First-degree (mild) dehydration.—The infant will lose between 2.5 and 5 per cent. of body weight. He is fretful and sleeps fitfully. The eyes are bright although they may appear slightly sunken. The fontanelle will be slightly depressed. Thirst is present and the mouth and tongue are dry. The lips are often bright-red and the skin is flushed and warm. At this stage treatment with oral fluids is usually successful.

Second-degree dehydration.—Loss of weight is between 5 and 10 per cent. of body weight. Fretfulness and sleeplessness are marked, and the infant may wail almost continuously. The eyes and fontanelle are sunken, and there is overlapping of the cranial sutures from shrinkage of the contents. The skin wrinkles easily, is warm over the body but cold over the face and extremities. Thirst may be extreme although milk feeds may be promptly vomited. The mouth is dry, the lips are pale and slightly cyanosed. Respiration may be rapid and pauseless due to acidosis, and this may be associated with increased muscle tone or twitchings. At this stage parenteral fluids are likely to be required.

Third-degree (severe) dehydration.—Over 10 per cent. of body weight has been lost. The infant lies limp and flaccid, often semi-comatose. The lips and extremities are cold and cyanosed, the skin ashen. The face is Hippocratic with deeply sunken eyes which have glazed corneæ and are usually rolled upwards. There is marked depression of the fontanelle and overriding of the cranial bones. Thirst is no longer apparent and, in fact, little effort is made to suck. Typical sighing acidotic breathing may be obvious although its absence in the newborn does not exclude severe acidosis. The rectal temperature may be raised to 105°F. (40.5°C.) although the skin is very cold. At this stage death is imminent and resuscitatory measures are urgently required.

BIOCHEMICAL DISTURBANCES

Whilst it is true that the general practitioner need not know much of these to treat the mild case, and the severe case is a problem for the hospital with good laboratory facilities, it is desirable that he should understand something of the upsets in the balance of body fluids and electrolytes which underlie the obvious clinical signs. Only thus can he anticipate future

developments with any real insight. Our understanding of these problems owes much to the work of Gamble (1951) of Harvard.

Loss of fluid from the circulation and extracellular space in diarrhœal stools and vomitus results in hæmoconcentration. This leads to raised levels of hæmoglobin, packed-cell volume and serum proteins. In gastroenteritis the loss of water is accompanied by loss of electrolytes. Acidosis is usual because there is a greater loss of sodium than of chloride in the stools which causes lowering of the bicarbonate concentration in the plasma. Not only is there loss of the extracellular electrolytes (sodium chloride and bicarbonate), but large amounts of intracellular potassium are lost in the stools and urine in severe cases. The potassium leaving the cells is replaced by sodium, without chloride, which increases the severity of the acidosis. Low rates of glomerular filtration with renal insufficiency result in a raised blood urea, and the retention of acid metabolites further adds to the acidosis. It is important to realize that the loss of extracellular electrolytes is much more serious than mere water loss because this leads to reduction in plasma volume with consequent peripheral circulatory collapse. Furthermore, the administration of water alone without electrolytes cannot correct the reduced plasma volume nor the deficit of electrolytes.

Changes in the concentrations of the various electrolytes in the plasma are not reliable guides to the concentration of these electrolytes in the extra- and intra-cellular fluid compartments, nor is their measurement necessary for the adequate management of mild cases. These estimations are, however, of value in assessing the progress of severe cases, especially if parenteral fluids are being given, and if the tests are repeated at intervals over several days.

DIFFERENTIAL DIAGNOSIS

In most cases the diagnosis of gastroenteritis presents no problem as there is a history of the sudden onset of diarrhœa and vomiting in an infant who has previously been well. An avoidable but not infrequent error is to mistake the symptoms of gross underfeeding for gastroenteritis. The underfed infant often vomits as the result of air swallowing, and although constipated at first later passes 'starvation' stools. These are loose but they are small dark green stains on the napkin, being composed mostly of intestinal secretions. They contrast with the large, watery grass-green stools of enteritis. Furthermore, a careful history will reveal the inadequate intake of calories. The underfed infant will, of course, be made still more marasmic if he is treated as a case of gastroenteritis. Breast-fed infants often pass frequent loose greenish stools. This must not be mistaken for gastroenteritis and will not be if the clinician remembers that infants with gastroenteritis are obviously ill, whereas the stools in healthy thriving breast-fed babies may vary without obvious cause and without any significance. Diarrhœa from parenteral infections such as pneumonia, otitis media and pyuria is, in my experience, much less common than some of the textbooks would suggest. They should be detected by adequate clinical examination. Some degree

of diarrhœa is not uncommon in staphylococcal osteitis in the newborn but there are likely to be signs such as swelling over the affected bone, pseudo-paralysis of a limb and toxæmia without dehydration.

If a new-born infant suffers from diarrhœa and vomiting with accompanying signs of dehydration he should be treated as a case of gastroenteritis, whatever other parenteral infection may be present.

TREATMENT

The aims of treatment may be summarized as follows:—

(i) To restore and maintain the volume and chemical composition of the body fluids.

(ii) To prevent tissue wastage and subsequently to ensure that normal growth is resumed.

(iii) To eradicate, if possible, the causal organism with chemotherapy or antibiotics.

The practitioner must decide whether he can successfully manage the case in the home, or whether hospital treatment is necessary. In this regard, he should bear in mind the dangers of cross-infection to which young infants are subject even in the best pædiatric units, and that expert advice is obtainable by a domiciliary consultation within the National Health Service. If the infant shows no dehydration or the signs of mild (first degree) dehydration, treatment at home is usually to be preferred. In most cases rapid recovery will ensue. In a few, deterioration will continue in spite of treatment, when admission to hospital will become necessary. Second and third degrees of dehydration are indications for hospital treatment because biochemical facilities and parenteral fluids are often urgently required.

HOME TREATMENT OF THE MILD CASE

Milk feeds should be completely withheld for twenty-four hours. This usually achieves marked reduction in the frequency of stools and vomiting. A healthy infant requires 2 to 2½ fluid ounces (60 to 75 ml.) of fluid per pound body weight (130 to 165 ml. per kg.) daily. The dehydrated infant has, of course, a deficit of water and salts from losses in stools and vomitus, and these must be restored, mostly simply in the form of a solution of sodium chloride. As the loss of sodium usually exceeds that of chloride, and as the kidneys of the newborn have difficulty in excreting excess chloride, it is best to give oral fluids in the form of dilute physiological saline. *Water alone will not correct dehydration in gastroenteritis.* In practice, one-quarter strength physiological saline (=1 teaspoonful of salt to 4 pints [2.3 litres] of water) given in small quantities (1 to 2 fluid ounces [30 to 60 ml.]) every one to two hours during the day, every three to four hours during the night, to a total of 3 fluid ounces (90 ml.) per pound body weight (200 ml. per kg.) daily is effective in correcting a mild degree of dehydration. I prefer to withhold sugar from oral fluids and feeds until diarrhœa has subsided because of its tendency to cause abdominal distension.

After twenty-four hours on dilute saline only, milk may be reintroduced in small volumes which are gradually increased as diarrhœa subsides. There are various ways of doing this. The custom in the Royal Hospital for Sick Children, Glasgow, is to start with ½ fluid ounce (15 ml.) feeds of breast milk or full-strength half-cream dried milk every four hours, and to increase them by ½ fluid ounce (15 ml.) per feed every twenty-four hours thereafter. Quarter-strength physiological saline is continued between feeds in volumes sufficient to bring the total daily fluids to 2½ fluid ounces per pound (165 ml. per kg.) for twenty-four to forty-eight hours, after which plain water is offered between feeds. Sugar is added to the milk feeds as soon as the stools are formed. Alternatively, the feeds may be graded by diluting these quantities of milk in quarter-strength saline, and later in water, until a full diet supplying 50 calories per pound (110 calories per kg.) daily of the infant's expected body weight is being given. In mild cases the losses of potassium are slight and will be corrected by the milk feeds themselves.

Drugs.—The varied etiology of infantile diarrhœa makes rational drug therapy difficult. Whenever possible cultures should be carried out and therapy planned according to bacterial sensitivities. Mild cases often recover quickly without any drugs at all. In the more ill, it is accepted that one of several drugs, such as sulphonamides, oral streptomycin, tetracyclines, chloramphenicol and neomycin, reduce the mortality, although there is little evidence that any one drug is superior. In hospitals neomycin has the advantage that its toxicity prevents its parenteral use, and the emergence of resistant strains of staphylococci is less serious. The oral dose for gastroenteritis is 50 mg. per kg. body weight daily, divided into four doses. It cannot be stressed too strongly that purgation with castor oil or other drugs is always wrong. This can only increase the loss from the body of water and electrolytes.

HOSPITAL TREATMENT OF SEVERE CASES

Transport to hospital.—The very ill new-born infant, especially if premature, is likely to reach hospital with a dangerous degree of hypothermia when transferred in an ordinary ambulance. In some regions a special heated cot or portable incubator in the charge of a trained nurse is available to the practitioner faced with this emergency. Some infant lives are undoubtedly lost from the lack of such arrangements in many parts of the country.

In hospital.—Second-degree dehydration can often be corrected by oral electrolyte solutions when vomiting is not too severe. Progress must be supervised by frequent clinical observation supplemented by periodic estimations of the serum or plasma levels of sodium, chloride, potassium, carbon dioxide, urea and proteins. Parenteral fluids given intravenously, and sometimes subcutaneously, must be used with great caution in the newborn because it is fatally easy to overload them with fluid or electrolyte with the development of cardiac failure or œdema, and the aggravation of acidosis and loss of potassium. Such therapy becomes imperative when there is

peripheral circulatory collapse or persistent vomiting. As a rule it is only required for twenty-four to seventy-two hours. The somewhat complicated solutions, techniques and records essential for success have been fully described in M.R.C. Memorandum No. 26 (1952) and will only be briefly considered in this article.

When third-degree (severe) dehydration is present resuscitation is urgently required. An intravenous infusion must be set up with as little disturbance to the infant as possible, after which he can best be nursed in an incubator in an atmosphere of 35 to 40 per cent. oxygen. A suitable fluid for resuscitation is citrated plasma diluted with equal parts of 10 per cent. glucose in water, 20 ml. per pound (44 ml. per kg.) body weight during the first two to four hours. If the veins are collapsed half this amount may be given by syringe initially. In second-degree dehydration treatment may also be started with diluted plasma or with 5 per cent. glucose in one-quarter strength physiological saline. Some use half-strength isotonic saline or Hartmann's solutions but in the small newborn there is real danger of overloading. The infusion is set to deliver 20 ml. per pound (44 ml. per kg.) body weight in the first four hours to establish a good urinary output, but subsequently the intake of parenteral fluid in the newborn should be restricted to a maximum of 75 ml. per pound (165 ml. per kg.) body weight in twenty-four hours. If there is severe acidosis one-sixth molar sodium lactate, 10 to 15 ml. per pound (22 to 33 ml. per kg.) body weight, can be given initially and may be repeated some four to six hours later if the acidosis persists. After twenty-four hours small milk feeds are introduced (as described above) and if they are retained the volume of fluid given intravenously is reduced in proportion. In the few patients in whom persistent vomiting necessitates more prolonged intravenous therapy protein should be supplied in the form of diluted plasma or hydrolyzed casein. If anæmia develops, blood transfusion (10 to 20 ml. per pound [22 to 44 ml. per kg.] body weight) will be required.

The treatment outlined cannot, of course, correct the serious deficit of intracellular potassium which may develop in severe gastroenteritis. In fact, the administration of solutions of sodium salts may further aggravate this deficit because sodium then replaces potassium in the cells (Darrow *et al.*, 1949; Darrow and Pratt, 1950). Clinical effects of a depletion of potassium include electrocardiographic changes, paralytic ileus and muscular weakness, although they are not often seen in very young infants. Their absence does not exclude the existence of a state of hypokalæmia. Several workers have given solutions of high potassium content by intravenous infusion to correct the potassium deficit in states of severe dehydration (Butler *et al.*, 1946; Darrow and Pratt, 1950). Details of their use may be found from several sources (Govan and Darrow, 1946; Medical Research Council, 1952; Young and Rogers, 1954). They must on no account be given until the initial state of hæmoconcentration has been corrected as already outlined, because heart block and cardiac arrest may occur if the

serum potassium level should rise above 8 mEq. per litre. The most reliable indication for the administration of potassium is the demonstration of hypokalæmia after the dehydration and circulatory collapse have been corrected. If potassium supplements are to be given intravenously it is essential that the quantities be controlled by frequent estimations of the serum potassium level and by periodic electrocardiograms. The use of flame photometry allows the laboratory to inform the clinician of the result within a very short time of receiving the sample. Even with this measure of control, many pædiatricians refuse to accept the risks of giving potassium intravenously to very small infants. They prefer to correct the deficit more gradually by adding potassium chloride, 1 to 2 g. daily, to the small milk feeds started after twenty-four hours. Provided there is by then a free flow of urine and no evidence of primary renal abnormality there is little danger of serious overdosage.

CONVALESCENCE

Infants who have had gastroenteritis are sometimes slow to gain weight satisfactorily afterwards. They should be given a daily intake of calories amounting to at least 50 *calories per pound* (110 *calories per kg.*) *of expected body weight per day*. Normal vitamin A, D, and C supplements should be started as soon as a full milk diet has been reached. Some give vitamin K and vitamin B complex during and after the illness, intramuscularly or orally, but the need is doubtful. Hospitals treating infants with gastroenteritis should aim at as early discharge as possible to minimize the dangers of cross-infection. This necessitates an efficient follow-up system and good cooperation with family doctors and health visitors.

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NEONATAL RESPIRATORY INFECTIONS

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Serious infections of the lower respiratory tract are not common in the neonatal period. In 1959, the neonatal mortality from bronchitis and pneumonia in England and Wales was 1.03 per 1000 live births out of a total neonatal mortality of 15.9 (Ministry of Health, 1960). So far as hospital obstetric practice is concerned the results of a pathological study at University College Hospital (Bound, Butler and Spector, 1956) are of interest. Out of a series of over 10,000 births there were 152 neonatal deaths. Pneumonia was the cause of death in 19 cases, representing 0.2 per cent. of all births and 12.5 per cent. of neonatal deaths. In addition there is an unspecified number of minor or non-fatal respiratory infections in neonates in both general and hospital practice.

BACTERIOLOGY OF THE RESPIRATORY TRACT IN THE NEWBORN

The respiratory tract is sterile at the time of birth but bacteria are rapidly acquired from the environment and an increasing number of positive cultures is obtained from the nasopharynx during the first week of life. In babies born in hospital the commonest bacterial invaders of the respiratory tract are coliforms and staphylococci derived from the maternal vagina and the general hospital environment respectively. These organisms can be recovered from the nasopharynx of some 50 per cent. of healthy babies by the third day of life, and in the case of *E. coli* the number of positive cultures is proportional to the time between rupture of the membranes and the birth of the baby.

USE OF ANTIBIOTICS

The antibiotic chosen for treatment of respiratory infections in the newborn must therefore be effective against both *E. coli* and *Staph. pyogenes*. The most suitable drugs are the tetracyclines, e.g. tetracycline and oxytetracycline, and a combination of soluble penicillin with streptomycin.

The following dosage of antibiotics is recommended for the treatment of neonatal respiratory infections and will be referred to in later sections of this article:—

Tetracyclines: 10 mg. per pound (22 mg. per kg.) body weight/day (oral)
5 mg. per pound (11 mg. per kg.) body weight/day (intramuscular)
Soluble penicillin: 20,000 units per pound (44,000 per kg.) body weight/day (intramuscular)
Streptomycin sulphate: 20 mg. per pound (44 mg. per kg.) body weight/day (intramuscular)

Each drug is given in divided doses every four to six hours and the intramuscular route is preferable.

Dihydrostreptomycin, sulphafurazole and chloramphenicol have serious toxic effects in the new-born baby and should not be used.

In view of the possibility of unusual bacterial sensitivities, pharyngeal swabs should be cultured whenever possible so that in the event of an unsatisfactory clinical response a change may be made to a more suitable drug as indicated by *in vitro* sensitivity tests.

Antibiotics should be prescribed for all babies born after premature rupture of the membranes, although there is still some doubt as to whether this practice reduces the incidence of neonatal respiratory infections.

THE FIRST WEEK OF LIFE

Respiratory infections in the first week of life present a special problem and will be considered separately from those in the subsequent three weeks of the neonatal period.

Upper respiratory infections.—Infections of the upper respiratory tract are not common in the first week of life. In an article on the subject of snuffles in new-born babies, Apley, Laurance and MacMath (1954) reported their observations on 87 cases, representing 2.6 per cent. of all live births in maternity hospitals in Bristol. These babies showed a watery, mucopurulent nasal discharge which started in the first week or so of life and usually lasted from two to seven days. The symptoms were slight in most cases and only occasionally were there complications such as complete nasal obstruction, fever, stridor or lower respiratory infections. There was no association between snuffles and congenital syphilis or the presence of *Staph. pyogenes* in the nose. Neither was there any seasonal incidence and in the opinion of the authors there was rarely a true infection present.

Because of a natural inability to breathe through the mouth new-born babies may suffer some distress from nasal obstruction, particularly during feeds. In the Bristol series one-third of the babies with snuffles had some difficulty in feeding. Nasal drops of 0.5 per cent. ephedrine in saline may relieve this difficulty if instilled before each feed, but prolonged use of such drops is inadvisable.

Lower respiratory infections.—During the first week of life infection of the lower respiratory tract usually takes the form of diffuse broncho-pneumonia. Pulmonary infection may arise *in utero* or soon after birth and may be primary or, more commonly, a secondary complication of other perinatal disorders. Pneumonia also occurs as a terminal event in babies with severe congenital abnormalities.

In the University College Hospital series (Bound, Butler and Spector, 1956) 60 per cent. of deaths from pneumonia in the first week of life were in premature babies. Over 50 per cent. of the deaths occurred on the first day and a further 18 per cent. between the first and third days of life. Factors predisposing to pneumonia were maternal infection during or immediately preceding labour, rupture of the membranes more than eighteen hours before delivery, fœtal anoxia, and complicated vaginal delivery.

It is often impossible to make an accurate clinical diagnosis of pneumonia

in the first few days of life. The clinical manifestations are often obscured by other underlying conditions which also give rise to respiratory distress (table I). Even when pneumonia is not associated with other pathological disorders the diagnosis is difficult as the clinical features are not typical and are often predominantly cerebral. To complicate the diagnostic problem still further, several of the conditions listed in table I may be present in one baby.

Clinical picture.—The following clinical picture of respiratory difficulty arising at or soon after birth is not therefore characteristic of any one pathological process. The onset of regular vigorous respirations may be delayed following delivery. Respirations, when established, are irregular and gasping or grunting in character and there is a variable degree of inspiratory retraction of the chest wall. There may be persistent central cyanosis or pallor. The baby is limp and shows little or no response to stimuli. Ex-

(1) Lesions of the central nervous system: Intra-cranial trauma and hæmorrhage Cerebral anoxia Congenital malformations of the brain	(3) Congenital heart disease and heart failure (4) Congenital malformations of the upper respiratory tract
(2) Pulmonary lesions: Aspiration of amniotic fluid — Pneumonia Atelectasis — Hæmorrhage Hyaline membrane — Pneumothorax	(5) Œsophageal atresia (6) Diaphragmatic hernia

TABLE I.—Causes of respiratory distress in the first week of life.

amination of the chest reveals diminished air entry and crepitations. A heart rate below 100 per minute is of serious significance.

The trend of the respiratory rate of babies who are quiet or asleep is a useful indication of the degree of respiratory distress. In infants with a steadily rising respiratory rate in the first few hours of life the mortality is 25 per cent. Respiratory deaths are unlikely in infants who do not show this rise in respiratory rate (Miller, 1957).

Certain signs and symptoms may give a lead to the diagnosis. Fits, a bulging fontanelle and a high-pitched cry are more often due to intracranial than to pulmonary lesions. Severe, increasing cyanosis and retraction of the chest wall suggest hyaline membranes. Pneumothorax, if severe, causes considerable respiratory embarrassment. Physical examination will reveal the classical signs of absent breath sounds and hyper-resonance on the affected side with displacement of the mediastinum to the opposite side.

Severe malformations of the heart may be accompanied by cyanosis disproportionate to the degree of respiratory distress. Cardiac murmurs are usually, but not invariably, present. The most reliable sign of heart failure is enlargement of the liver. Three uncommon but important congenital abnormalities constitute surgical emergencies and should be recognized as early as possible if life-saving surgery is to be undertaken successfully. Congenital malformations of the upper respiratory tract often cause obstructed stridulous breathing with marked retraction of the chest wall, and must be

investigated by laryngoscopy. Œsophageal atresia should be suspected when an infant frequently regurgitates frothy mucus and saliva after birth. The suspicion can be confirmed by attempting to pass a tube down the œsophagus, when an obstruction will be felt a short distance below the pharynx. Diaphragmatic hernia is usually on the left side and gives rise to severe respiratory distress, mediastinal shift to the right and signs at the left base due to the presence of abdominal organs in the chest.

Finally, radiography of the chest may help in differential diagnosis particularly in cases of hyaline membrane, pneumothorax, congenital heart disease, œsophageal atresia and diaphragmatic hernia.

Treatment.—When congenital abnormalities have been excluded treatment with antibiotics on the lines previously suggested should be given to all babies who show respiratory distress in the first few days of life in case pneumonia is present. In addition, a clear airway should be maintained, and oxygen administered if cyanosis is present. Intramuscular vitamin K, in a dose of 1 mg., may diminish the risk of pulmonary hæmorrhage.

RESPIRATORY INFECTIONS AFTER THE FIRST WEEK

After the confused clinical picture in the first week of life, respiratory infections in the latter part of the neonatal period are more easily recognized and fall into more clear-cut categories. The response of babies of this age to respiratory infection, however, is still rather different from that of the older infant.

UPPER RESPIRATORY INFECTIONS

Infections of the upper respiratory tract are still relatively infrequent at this stage and give rise either to snuffles with a slight cough or to a short-lived febrile illness without specific symptoms. Pharyngitis, catarrhal rhinitis, otitis media and sinusitis which are all so common in older children are rare events in neonates. Acute ethmoid sinusitis, however, is relatively more common in small infants. This condition presents as peri-orbital cellulitis, the skin of the face being red and œdematous. Affected infants are usually quite ill with a high temperature and it may be difficult to determine whether or not they have osteomyelitis of the maxilla. Ethmoiditis should be treated with antibiotics as a bacterial infection is commonly present.

New viruses are being discovered at an alarming rate and in the past ten years no fewer than 35 different types, known to produce respiratory tract infections, have been identified (Rhodes, 1960). Some of these, for example the hæmadsorption viruses (Parrott *et al.*, 1959), have occasionally been found in new-born infants with respiratory infections. These viruses do not produce specific clinical syndromes, with the exception of the croup-associated virus (acute laryngeal stridor), adenovirus (pharyngo-conjunctival fever) and Coxsackie group A virus (vesicular pharyngitis—herpangina). Antibiotics do not influence the course of virus infections and it is doubtful whether their use as a prophylactic in neonatal upper respiratory infections is justifiable.

LOWER RESPIRATORY INFECTIONS

In general, lower respiratory infections in small infants are severe illnesses due to viruses, in which there is diffuse infection of the bronchial tree. In older children the infection is not very severe and is more often bacterial with segmental pulmonary lesions. In the newborn, laryngeal stridor is more commonly due to congenital abnormalities than to infection. Acute laryngo-tracheo-bronchitis is rarely seen at this age, and infections of the lower respiratory tract are limited to acute bronchial infections and segmental pneumonia.

ACUTE BRONCHIAL INFECTIONS

From a clinical point of view it is difficult to distinguish between bronchitis, bronchiolitis (capillary bronchitis) and broncho-pneumonia, the three types of acute bronchial infection which occur in neonates and older infants. Certain symptoms and signs are common to all three groups. After a preliminary upper respiratory infection there is an exacerbation with fever, cough, and varying degrees of respiratory distress. Generalized rhonchi and râles are heard on auscultation. In practice the distinction between these diseases is made on the severity and the degree of bronchial obstruction. Acute bronchitis is the least severe infection. The cough, although loud and wheezy, is not distressing and there is no cyanosis or obstruction to breathing. The added sounds are usually coarse and restricted to the larger bronchi. The acute stage of the illness lasts only a few days, although the cough may persist for a week or more.

Broncho-pneumonia and bronchiolitis are both severe illnesses in neonates and severe bronchiolar obstruction is the distinguishing feature of the latter. Acute asthmatic attacks, which can certainly occur in infancy, are not considered here as a separate entity from bronchiolitis. The predominant feature of both conditions is obstruction and it is impossible to be certain whether this has an allergic or infective basis. In the general clinical picture the progression of the infection from upper to lower respiratory tract is indicated by a sudden deterioration. The infant's colour changes to a sinister shade of grey due to a combination of cyanosis and pallor. The respirations become rapid and grunting with reversal of the normal rhythm. The cough is dry, irritant and exhausting. Râles or crepitations are heard all over both lungs but in broncho-pneumonia crepitations may be localized to the areas of consolidation. As in all infections in the newborn the severity cannot be correlated with the fever and some of the worst cases have either a normal or subnormal temperature.

The obstruction of bronchiolitis is suggested by shallow, laboured respiratory activity with suprasternal and subcostal recession of the chest wall, cyanosis and a prolonged expiratory wheeze. On examination the percussion note is hyper-resonant due to obstructive emphysema, the entry of air into the lungs is greatly reduced and there are noisy rhonchi, râles and crepitations. If the disease progresses beyond this point the infant may become dehydrated and collapse into a state of peripheral circulatory failure.

In some cases the disease runs a rapid fulminating course and death takes place within a few hours. Detailed studies of necropsy material in some cases of sudden death in infancy have shown evidence of acute bronchial infection when circumstantial evidence pointed to suffocation as the cause of death. Fortunately, the usual course is more favourable. There is a gradual improvement over about two weeks and the severe respiratory distress lasts only a few days. The mortality is surprisingly low.

There is good reason to believe that most of the acute bronchial infections in small infants are caused by viruses although specific viruses cannot constantly be isolated. There is often a preceding viral upper respiratory infection and pathogenic bacteria are found only with the same frequency as in normal infants. During influenza epidemics there is an appreciable rise in the hospital admission rate for infants with bronchiolitis. Bronchopneumonia is more likely to be due to bacterial agents than bronchitis or bronchiolitis, and in all three diseases secondary infection with bacteria sometimes occurs.

Treatment.—Admission to hospital is necessary in all but the mild cases. In spite of the probable viral etiology it is not possible to exclude the possibility of primary or secondary bacterial infection in any single case and as these infants are often desperately ill antibiotics should be given. The common bacteria found in the respiratory tract of the newborn include both gram-negative and gram-positive organisms and treatment should be started with either a tetracycline or penicillin and streptomycin as described earlier.

Symptomatic treatment is also of benefit in the severe cases. The baby should be nursed in an oxygen tent with a cold moist atmosphere. Chloral hydrate (10 to 20 mg./pound [22 to 44 mg. per kg.]) and quinalbarbitone sodium (3 mg./pound [6.5 mg. per kg.]) are useful sedatives for all restless babies with respiratory infections. When bronchial obstruction is very severe it may be necessary to aspirate the sticky mucus through a bronchoscope. Bronchodilators, antihistamines and aerosols of wetting agents, such as 'alevaire', have not been shown conclusively to have any beneficial effect. Similar doubts exist about the value of steroids but I have been impressed with the improvement in some seriously ill babies following the use of these drugs.

A practitioner called to see a baby, already in respiratory distress from acute bronchial disease, should invert the baby and aspirate the pharynx with a mucus extractor. For a baby *in extremis* an intramuscular injection of hydrocortisone hemisuccinate (50 mg.) is worth trying as a life-saving measure. These babies travel badly so that oxygen and hot-water bottles should be provided for the journey to hospital. Ideally a nurse or doctor should accompany the baby in the ambulance in case further aspiration is needed.

SEGMENTAL PNEUMONIA

Classical pneumococcal lobar pneumonia does not occur in neonates. Pulmonary consolidation at this age affects a smaller segment and the com-

monest organisms are *E. coli* and *Staph. pyogenes*. *E. coli* are derived from the maternal vagina during birth and infections with this organism are as common in babies born at home as in those born in hospital. Staphylococcal sepsis is almost always acquired in hospital.

The feature of segmental pneumonia is the presence of clinical and radiological signs of localized areas of consolidation in a baby with the usual picture of a severe lower respiratory infection. In staphylococcal pneumonia there may be a history of preceding infection in the eyes, skin or umbilicus. The illness is more severe than *E. coli* pneumonia and resembles bronchopneumonia. Empyema and pneumothorax are common complications, the latter being the result of rupture of air-containing pulmonary cysts. The mortality in neonates is about 50 per cent.

Treatment.—Every attempt must be made to identify the organism and to determine its sensitivity by taking blood for culture and swabs from any superficial site of infection and from the nose and throat. Antibiotic therapy is far more important in segmental pneumonia than in the infections which are primarily viral. Either a tetracycline (by the intramuscular route) or the penicillin-streptomycin combination may be used initially, but in much bigger doses than have so far been recommended, and a change of drug may be necessary when the sensitivities of the organism are known. Treatment with antibiotics must be continued for several weeks if the infection is to be completely eradicated.

In addition to the usual symptomatic measures surgical treatment is often required for the complications of empyema and pneumothorax.

CARDIAC FAILURE

Cardiac failure demands special mention as an important differential diagnosis of lower respiratory infections in neonates and older infants. The usual signs are not found at this age and there may be no murmur. Fever, respiratory distress, sub-costal recession and basal crepitations are commonly present. The one reliable sign of cardiac failure is enlargement of the liver and its presence in a neonate with respiratory symptoms is an indication for giving digoxin (digitalizing dose = 0.04 mg./pound [0.09 mg./kg.] in three divided doses eight-hourly) together with antibiotics.

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THE CARE OF THE SKIN IN THE NEWBORN

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In all probability the skin of infancy has borne the brunt of more publicly disseminated advice than has been the lot of any other organ throughout life. The combined effect of traditional empiricism and advertising barrages has been to create the impression that during this period the skin is in an infinitely precarious state requiring constant succour. This is not so. Infantile skin is a remarkably adaptable tissue and normally requires negligible artificial aid to continued health, provided that attention is paid to a few basic principles of routine care.

ROUTINE CARE

It is now widely agreed that ritualistic cleansing following birth should be reduced to a minimum. So far as practicable the vernix caseosa should be left to disappear naturally. Likewise, the physiological desquamation of early postnatal life, facial milia, and occasional acneiform lesions call for no active measures since they will clear spontaneously.

If health is subnormal as a result of prematurity or disease bathing must be postponed. In these circumstances essential toilet may be performed with a little warm arachis oil. Otherwise, bathing should be started the day after birth, using a good minimally scented brand of baby soap. The soap substitutes now available are normally unnecessary. Similarly, the routine incorporation of antibacterial agents in toilet preparations is superfluous and possibly harmful. It is impossible to stress too emphatically the importance of ensuring that every trace of soap is subsequently washed off with fresh water, special attention being paid to the flexures. If this is neglected the stage is set for increasing concentrations of soap residues to initiate a primary irritant dermatitis. The skin should be dabbed, not scrubbed, and dried with a soft towel. Once again, the creases require particular care. This may be followed by the sparing application of a plain dusting powder. Boric acid is best omitted from such preparations. The overenthusiastic use of powder does more harm than good. Moist accumulations remain in the folds and chafe the apposed skin surfaces. The napkin must be removed as soon as practicable after it is soiled. This should be followed by gentle washing of the buttocks in warm water.

The belief still lingers that a tropical nursery environment is a *sine qua non* of infantile well-being. In fact, the hyperidrosis so induced provides a fertile soil for the development of a variety of cutaneous disorders. It is equally important that the skin be both well ventilated and protected from

undue abrasive injury. Clothing should be light, soft, and non-occlusive. Similarly, harsh and heavy bedding materials must be avoided. Garments should preferably be washed with soap. The cleansing agent, however, is usually of less importance than the amount of care taken in removing all residual traces. Meticulous attention must be paid to final rinsing. If it is considered necessary to sterilize the napkins this is best achieved by means of heat rather than the use of antiseptics.

ICHTHYOSIS

Dyskeratinization is commonly met with in the form of ichthyosis. This condition may range in severity from minor roughness of the skin surface, through the classical fish-scale desquamation, to a disabling, even fatal, affliction. In addition, hypoplasia of the sweat and sebaceous glands may be present, thereby adding to the clinical picture of xeroderma. Soap accentuates these changes and its use should be reduced to a minimum. Emulsifying ointment B.P. is helpful as a bath emollient. One ounce (28.5 g.) is added after preliminary creaming in a jug of hot water. At other times simple lubricants, such as hydrous ointment B.P., should be applied as often as necessary. The possibility of heat intolerance must be borne in mind in the case of severely affected subjects.

EPIDERMOLYSIS BULLOSA

A comparatively wide clinical spectrum is seen in this relatively uncommon condition which is characterized by defective cohesion of the epidermis and corium, resulting in the formation of vesiculo-bullous lesions in response to minor injury. Naturally, the pressure points of the extremities are most commonly affected. The trait may be present at birth or appear in early infancy. It varies in severity from the dominant inheritance of occasional simple blister formation to recessively acquired widespread cutaneous destruction and resultant scarring. The management of these cases consists largely of measures guarding against mechanical injury to the skin.

NÆVI

The term, 'nævus', has been used in so many different senses that it is incapable of precise definition. Here 'nævus' and 'birthmark' are regarded as synonymous. In the neonatal period *vascular nævi* form the majority of these defects. The *immature variety* (strawberry mark) is the commonest, and is present at, or appears shortly after, birth. It subsequently undergoes a certain degree of enlargement as a result of canalization of the primitive vascular components which make up the lesion. This process is self-limiting, however, and ultimately spontaneous complete regression almost invariably takes place. These nævi present as sharply delimited soft elevations of variable size. The colour is dependent upon the plane of location in the skin. If in the upper dermis they are of bright-red hue, but when more deeply situated they possess a purple element. Although there still

exists great divergence of opinion regarding the management of these lesions, it is now widely agreed that active measures in the form of minimal radiotherapy are called for in only a very small proportion. Many now restrict the indications for such induction of earlier involution to: (1) major disturbance of function (for example, as a result of large peri-orificial lesions); (2) rapid progression of extensive nævi in which there is a risk of widespread ulceration. Superficial erosion is often encountered in sites subjected to frictional damage. It is usually rapidly healed by a topical antibiotic, such as 0.5 per cent. neomycin ointment. The occasional hæmorrhage following injury is, as a rule, promptly controlled by local compression.

Nævus flammeus is a flat variety of vascular birthmark. It ranges between short-lived cutaneous reddening, most commonly involving the nuchal area, forehead, and upper eyelids, and permanent bluish-red 'port wine' stains. The latter are composed of numerous ectatic blood vessels of mature type. In contrast to the strawberry mark these nævi do not increase in size other than in relation to the region involved. Treatment is unsatisfactory from the curative standpoint, although a minority of cases are improved by thorium-x therapy. There is, however, no indication for instituting such procedures during the neonatal period.

Melanocytic (*'pigmented'*) *nævi* require no active measures in early infancy. Later, if they are disfiguring, the feasibility of plastic surgical removal will require consideration. *Keratinocytic* (*'epithelial'*) *nævi* are less often encountered. Usually they are present at birth or make their appearance in early infancy. Although varying considerably in character, they commonly occur as wart-like papules or plaques, sometimes of linear configuration. There is no indication for treatment in infancy.

THERMAL DERANGEMENTS

Thermally induced hyperidrosis is commonly encountered in infancy as a result of the widely prevalent maternal tendency towards overclothing and overheating. The continuously moist skin undergoes macerative changes which pave the way for sweat poral obstruction and the subsequent development of *miliaria*. This usually takes the form of profuse small erythematous papules or papulo-vesicles. The most heavily occluded areas naturally show greatest involvement. Miliarial eruptions rapidly undergo spontaneous regression if the cutaneous environment is reduced in temperature and humidity, and time is well spent in educating the mother in regard to suitable clothing of her infant and adequate heating of the nursery.

In the winter months varying degrees of *acrocyanosis* of the exposed areas are commonly seen. Inadequate protection during cold weather, however, may induce a more serious condition: *neonatal cold injury*. The cutaneous manifestations of this potentially grave disorder are characterized by striking erythema of the face and limbs followed by the progressive development of diffuse firm œdema. This change is sometimes referred to as

sclerema neonatorum. This term, however, has also been applied to two other conditions. *Pre-agonal induration of the skin* occasionally ushers in the final stages of a fatal illness. By contrast, *subcutaneous fat necrosis* is encountered not infrequently. It occurs in otherwise healthy infants, and takes the form of firm, yellow or livid, hypodermal plaques, most commonly situated over the cheeks, shoulders, or buttocks. Usually the lesions appear at birth or in early infancy and, after persisting for a variable length of time, slowly regress spontaneously.

INFECTIONS

Neonatal skin is very prone to develop superficial coccal infections, especially with certain strains of *Staphylococcus pyogenes*. These infections may assume the characters of *impetigo contagiosa*—erythematous macules passing rapidly through a superficial vesicular phase to produce seropurulent, exudative, crusting lesions. Not infrequently, however, the vesicular phase is more protracted. Instead of rupturing, the lesions enlarge to form flaccid bullæ. Extensive instances of such bullous impetigo are traditionally designated *pemphigus neonatorum*. Severe infections of this type occur most often in debilitated infants under conditions of poor environmental hygiene. Formerly much emphasis was placed upon the clinical differentiation of this condition from the more polymorphic rash of congenital syphilis. Today this exercise is largely of academic interest. In atypical instances, however, serological tests should be performed.

If occurring in hospital, every case of pyogenic coccal skin infection should be isolated and rigid precautions taken against the extension of the infection. All crusts must be separated, if necessary following preliminary softening with normal saline compresses. Likewise, the roofs of bullæ are best removed. An antibiotic ointment of low sensitizing capacity (such as 0.5 per cent. neomycin) is then applied to the erosions not less than three times daily. This should be continued until every trace of active infection has disappeared. If the condition is severe, systemic antibiotic therapy should be given concurrently, preferably in association with bacteriological studies. Should multiple cases occur, steps must be taken to exclude the presence of a carrier of pathogenic cocci among the nursing and medical staff. In such circumstances the routine substitution of a hexachlorophane cleansing agent for plain soap is of assistance in preventing further extension.

Kaposi's varicelliform eruption is encountered occasionally in the neonatal period. It occurs as a result of infection of an already damaged skin with the viruses of herpes simplex or vaccinia. Eczematous rashes provide a fertile terrain for the development of the condition, and care should be taken to avoid exposure of such infants to foci of infection with these viruses, especially 'cold sores' of the lip and unhealed vaccination reactions. In such circumstances primary invasion of the skin takes the form of an acute, widespread vesiculo-pustular rash. The accompanying febrile reaction is often striking, and not uncommonly the patient is gravely ill. Supportive

treatment and antibiotic therapy to forestall secondary bacterial infection are of primary importance, whilst in vaccinal cases the administration of hyperimmune vaccinal gamma-globulin may be of benefit.

ECZEMA

This cutaneous reaction pattern commonly presents in early infancy as ill-defined areas of erythema and desquamation. A frankly vesicular element is rarely encountered at this age. Exogenous *primary irritation* plays a leading causative role. On the face, food residues, saliva, and climatic overexposure are common offenders, whilst on the limbs and trunk the friction of clothing and bedding materials must be borne in mind. In addition, unsuitable soaps or inadequate rinsing after bathing are often of importance both in initiating and aggravating the process. By contrast, contact allergy as a cause of eczematous reaction is of extreme rarity at this age.

It is not the purpose of this article to discuss at length that central problem of pædiatric dermatology, *atopic dermatitis*. The first clinical expression of this genetically determined cutaneous dysfunction may occur shortly after birth. Thereafter it appears with increasing frequency throughout early infancy. The degree of cutaneous involvement is inconstant, varying between occasional low-grade facial lesions and widespread persistent affections of the skin which repeatedly relapse in response to minimal stressful stimuli of both external and internal origin.

The rational management of neonatal eczema necessitates initial detailed clinical evaluation with a view to the detection and subsequent elimination of causal factors such as those already described. Topical therapy is best confined to simple bland preparations. Owing to the risk of absorption mercurial compounds should no longer be prescribed. Localized reactions are most effectively controlled by topical corticosteroids, such as hydrocortisone cream (0.5 per cent. is usually an adequate concentration). If widespread, a preparation such as zinc cream B.P. is useful. Bathing can often be continued without ill effect if one ounce (28.5 g.) of emulsifying ointment B.P. is added to the water, as described on p. 195. When irritation and excoriation are troublesome a sedative antihistamine such as promethazine hydrochloride, 5 mg. at night, may prove helpful.

Differential diagnosis.—Two uncommon disorders are occasionally misinterpreted as eczematous. *Congenital ichthyosiform erythroderma* presents as a generalized persistent erythemato-squamous eruption. It is customarily regarded as a dyskeratosis akin to ichthyosis. *Incontinentia pigmenti* largely affects females. Although the basic etiology remains unknown an undoubted genetic factor is operative in some cases. Associated developmental defects are commonly present. The numerous vesiculo-bullæ on an erythematous base often exhibit a striking linear distribution. After a few weeks spontaneous subsidence occurs, in some instances leaving hyperkeratotic papules and plaques. These verrucous lesions ultimately regress, although residual areas of melanotic hyperpigmentation, often of bizarre pattern, persist.

SEBORRHŒIC DERMATITIS

In infancy the eruptions of seborrhœic dermatitis often merge with those of eczema. Simple affection of the scalp can usually be controlled by a preparation such as 1 per cent. of precipitated sulphur and salicylic acid in hydrous emulsifying ointment B.P. This may be applied at night and washed out the following morning. More extensive eruptions tend to involve the flexures predominantly. Such rashes are commonly seen in the retropinnal and inguinal regions, particularly in infants who are overweight. In these circumstances a cream containing both an antibacterial agent and a corticosteroid is often very effective (for example, 3 per cent. 'vioform' [iodochlorhydroxyquinoline] and 1 per cent. hydrocortisone). Subsequently, increased attention should be paid to the bathing and powdering routine.

NAPKIN RASHES

A substantial proportion of the eruptions occurring in this area represent *eczematous reactions* to the primary irritant effects of infrequently changed or incorrectly laundered napkins. In other cases *sweat retention* plays a major causative role. Continuous skin contact with moist garments leads to waterlogging of the horny layer, a process which is often materially aggravated by the excessive use of waterproof pants. This maceration often results in sweat-duct occlusion and the development of an erythematous papulovesicular miliarial eruption. Subsequent pyogenic coccal infection will be followed by the appearance of pustular lesions which will require topical antibiotic therapy.

Some napkin rashes are primarily of infective origin. The warm moist skin-folds provide a fertile soil in which a variety of micro-organisms can become established, especially if the mother is not careful to clean these areas thoroughly. Such *intertriginous dermatitis* usually responds satisfactorily to an antibacterial-corticosteroid cream such as that already mentioned. Occasionally, however, a frank *monilial infection* becomes established. Should the clinical appearances and cultural findings indicate that this is so, twice-daily paintings with an 0.5 per cent. aqueous solution of crystal violet should be instituted. Alternatively, nystatin ointment (100,000 units per g.) may be applied. Later, when the infective process has subsided, the use of a hexachlorophane dusting powder may be helpful in preventing recurrence. It must be emphasized, however, that, as with all other simple eruptions occurring in this area, attention to the basic principles of skin care is of paramount importance.

THE CONGENITALLY ABNORMAL INFANT

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This necessarily cursory survey of a large subject will concentrate on the diagnosis of conditions requiring surgical management and will give an indication of the timing of treatment, and the results to be expected.

Thorough examination of the new-born baby coupled with an appreciation of the danger signals indicating further investigation will result in early diagnosis before complications add to the risks and difficulty of treatment. The principal danger signals are frothing (excessive pharyngeal mucus), vomiting which is green or persistent, cyanosis in attacks or continuous, and dribbling micturition—the baby who is really 'always wet'.

HYDROCEPHALUS

Hydrocephalus is a tragic defect. If the head is large at birth the outlook is poorer than for the baby whose head begins to grow in the first months of life. Many cases are due to a congenital abnormality obstructing the flow of cerebrospinal fluid (especially those associated with spina bifida). Others are due to perinatal accidents: low-grade meningitis (which may settle without specific treatment and may only be recognized in retrospect), or hæmorrhage blocking the cerebrospinal pathways. Thus a considerable proportion are babies who began with a normal brain. Laurence's (1958) follow-up of untreated cases showed, surprisingly, that one-half arrested spontaneously although only half of these had a normal intelligence (I.Q. over 85). It therefore seems that a procedure which would relieve the brain from pressure damage for a period while the pathways recanalized would be valuable and that lifelong drainage may not always be required. My own limited experience bears out Macnab's opinion that the insertion of a Spitz-Holter ventriculo-atrial shunt valve arrests hydrocephalus in about 75 per cent. of cases up to three years after operation, and this gives some hope for the future. Criteria for selection of cases are still inadequate so that early referral for an opinion is helpful.

PLAGIOCEPHALY

Plagiocephaly—an asymmetric skull—may be found in the newborn in association with *postural torticollis*. This is a benign condition outgrown in a few months with the help of passive movements. The more important sternomastoid torticollis which often needs operation is not present at this time. It becomes apparent as the child grows and the fibrotic muscle lags, but a sternomastoid tumour may be present as a forerunner. Most sterno-

mastoid tumours settle down within a few months and leave no aftermath but in some sternomastoid torticollis will follow. The typical hard tumour, like a nut in the lower third of the muscle, is usually felt a week or two after birth. Only passive movements and observation are required at this stage.

Plagiocephaly may also be associated with *infant postural scoliosis*. All babies wriggle but in infant postural scoliosis, whilst the baby can easily be coaxed to turn the spine to one side (usually the right), he cannot be turned to the opposite side. A limited range of movement must be demonstrated—and confirmed radiologically. Most cases recover spontaneously, but more important is the suggestion made by Denis Browne (1956) that a minority progress to 'idiopathic scoliosis'. As this cannot be cured after the walking age, in the present state of our knowledge treatment in a Denis Browne frame and by physiotherapy is justified if the curve is gross or does not settle in three or four months.

HARELIP AND CLEFT PALATE

These deformities, together or singly, occur in 1 : 800 births. The diagnosis is usually only too clear. Errors are sometimes made in isolated cleft of the soft palate. This is so short in the newborn that it may mistakenly be called a cleft uvula. It is a serious mistake, for cleft-palate speech results from failure of the oro-nasal sphincter to close off nose from mouth and a soft-palate cleft needs the same careful and thorough repair as a longer one to achieve good closure. The narrower handle of a teaspoon is better than a tongue depressor to visualize the soft palate in the newborn.

The immediate problem is feeding. Isolated harelip will not prevent normal suckling unless the alveoli are so distorted that an airtight fit cannot be made with the nipple. In isolated cleft palate the baby may be able to suck from a bottle with a large teat in which a large hole has been made. In complete clefts of lip plus palate and when these measures fail it is best to feed from a teaspoon. The mother soon learns the knack of tipping the milk into one cheek. The special cleft-palate teats with a flap to close the gap are better avoided. The flap rubs the edges of the cleft and septum causing ulceration and encouraging thrush; further, the crevice under the flap where it joins the teat is very difficult to keep clean. The baby should not be allowed to persist in prolonged efforts to feed from breast or bottle—he will get more air than milk and regurgitate much of what he takes. Prompt resort to spoon-feeding enables the mother to cope early and maintain her confidence.

A special group are those infants with post-alveolar clefts of the palate associated with a very small lower jaw (the Pierre-Robin syndrome). The relatively large tongue falls back and may choke the baby. Such babies must *never* lie on their backs. A crisis of obstruction can be managed by a tongue stitch and forward traction. Feeding is also difficult as the narrow airway is further occluded in swallowing. Holding the angle of the jaw forward during feeds may be enough, but severe cases need hospital attention and may

require tube feeding for several weeks. Occasionally tracheostomy has to be done. Between six and twelve weeks of age growth of the air passages is sufficient to overcome these troubles.

It is usual to operate on the lip at about three months of age and when the child is growing well (about 10 pounds [4.5 kg.]). For technical reasons the palate repair is usually left to about eighteen months of age, and the babies cope with feeding surprisingly well in the interval. Recent developments in orthodontics have made it possible to align the twisted alveolar segments before lip repair by means of sucking plates. These can be inserted within a few days of birth (Burston, 1958). The main object is to produce a more stable dental arch and avoid the collapse of the middle of the face during growth which mars many good early results. It also facilitates a good primary repair of the nostril. I have been impressed by the early results of such management though longer follow-up is required.

EXOMPHALOS

Exomphalos is a readily visible abnormality in which prompt treatment within a few hours of birth can greatly facilitate handling. There are two main types. Hernia into the cord produces a mass perhaps the size of a tangerine in which most of the small intestine can be seen, but the neck of the sac is small. If the cord is slowly twisted the contents may be squeezed back into the abdomen. Adhesive strapping around the cord and on to the abdomen prevents recurrence and the baby can be managed in normal fashion. This manœuvre is more difficult a few hours later when the gut has filled with swallowed air. The other type of exomphalos is hemispherical with a wide base. The smaller ones can be closed at operation. The larger ones, especially if the liver is in the sac, may require staged repair (Gross, 1953), or spontaneous epithelization may be awaited using simple dressings (Cunningham, 1956). The dangers of perforation and infection are less than one would expect. Unfortunately, serious abnormalities, such as cardiac and diaphragmatic defects, are commonly associated with exomphalos.

TALIPES

Clubfoot (*talipes equinovarus*) is a deformity of the whole foot including an inturned heel. It must be distinguished from 'inversion spasm', a benign condition in which the foot is held in equinovarus but can be coaxed into the opposite position. In talipes there is a limited range of movement, not merely a foot held in an unusual position. Inversion spasm passes off within a few weeks untreated but talipes gets stiffer day by day and should be classified among the acute emergencies of the neonatal period. If the Denis Browne method is used *without modification* good correction can be obtained in 90 per cent. of cases without anæsthesia, hospitalization, or frustration from walking as soon as the child wants to.

Metatarsal varus is a much less serious condition. It can easily be distinguished from clubfoot if the heel is observed from the back. It has a

normal range of movement. Like the opposite deformity, *talipes valgus*, it is much easier to correct in the neonatal period.

CONGENITAL DISLOCATION OF THE HIP

Congenital dislocation of the hip is not immediately apparent at birth. The simple test of abduction of the flexed thighs (fig. 1) will reveal it and a plea is made for its routine performance. The normal joint abducts to about 80° but a dislocated joint only abducts to about 45°. Some hips are stiff without being dislocated but the limitation is usually less, and x-rays and follow-up with the mother performing circling manipulations will distinguish them. There are, however, some cases of 'congenital' dislocation in which the dislocation does not occur until after birth so the test should be repeated at later examinations. If this test were taught and performed by midwives and clinics a valuable step would be taken in the conquest of this disabling deformity. At this age most cases can be reduced by a simple apparatus to maintain abduction for a few months and development of the joint is much better than after later correction, but this is not the whole problem. The most difficult cases are those (usually bilateral) in which there is a marked primary dysplasia as well as dislocation and in these, early diagnosis alone may not be enough though it will still help.

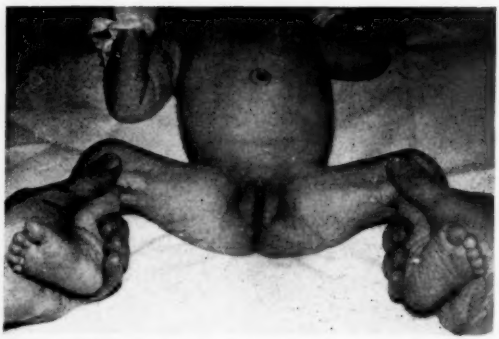

FIG. 1.—Testing hips by abduction in flexion. This is the usual normal range. A dislocated hip will only abduct about half as far. The natal cleft is kept vertical to avoid errors of assessment of abduction on each side.

SPINA BIFIDA

Spina bifida is regrettably common (about 1 : 500 births). Many cases survive even without treatment, with multiple disabilities: orthopædic due to lower-limb palsy and insensitivity, urological due to bladder palsy, and mental due to associated hydrocephalus. Management of the bowel by a training regime is easier than might be expected. Ellison Nash has estimated that there are about 10,000 such children of school age in the country at present. A large epithelized meningocele with a narrow base may cause no neurological symptoms but a flat yet broad-based raw myelocele will usually cause a virtually complete defect below the level of the lesion. In view of this survival rate—much higher than used to be thought—more active management has been undertaken to forestall complications rather than attempting to salvage the survivor of several years of misery.

The orthopædic defects can be managed on lines similar to those used in poliomyelitis. The urological defects can be managed even to the extent of transplantation of the ureters into an isolated loop of ileum in incontinent girls. This drastic operation is gratefully accepted as an alternative to a wet smelly life (Ellison Nash, 1956). Hydrocephalus occurs in about one-half but may now be controlled by operations including the Spitz-Holter valve. If such an active attitude seems justified in a particular baby then early closure of the spinal defect will usually be the first step—before the surface becomes infected. It used to be believed that the sac had some value as a safety valve protecting the child from hydrocephalus, but recent pathological studies (Laurence, 1959) suggest that it is a common site of origin of low-grade meningitis which may precipitate hydrocephalus in the presence of the usual Arnold-Chiari malformation of the brain.

The progress of these babies is so unpredictable that it is unwise dogmatically to say that the outlook is hopeless. In the long run most of the parents will prefer an active attempt to ameliorate a serious lesion rather than a waiting policy. Attempts to persuade the mother to put the child out of mind by immediate admission to an institution may seem kind at the time but often lead to later grief as the mother inevitably wonders about the baby growing up away from her. The ideal would seem to be to give help as it is needed and, if the child must go to a home eventually, this will be accepted better after the mother has made an attempt to cope. There is no clear-cut medically correct course according to the anatomy of the abnormality—it must be tempered by the feelings of the parents and their individual family situation.

ANO-RECTAL ANOMALIES

Ano-rectal anomalies are all visible except ano-rectal stenosis which is easily palpable on rectal examination. The reason ano-rectal anomalies are still missed for a time is usually that flatus is passed and meconium stains the napkins and therefore local examination is perfunctory. Imperforate anus is a poor name for this group of anomalies—there is almost always an orifice somewhere: in the perineum, in the vulva or into the vagina or male urethra. It is almost always too small, however, and even the adequate passage of milk stools is not an indication to delay treatment, because rectal dilatation and inertia may progress until gross constipation leads to overflow incontinence. There are three main groups of about equal frequency and, happily, in two of them continence is achieved in about nine out of ten cases with simple prompt measures.

Covered anus (fig. 2) results from excessive fusion of the anal tubercles and genital folds. There is usually a small orifice either over the anus or more commonly farther forward in the perineal raphe. A thin membranous area may be present and meconium be seen to shine through. A minor operation to uncap the anus, followed by daily dilatation for three months until the healed tissues are supple, results in regular achievement of normal continence.

Ectopic anus is the name applied to a bowel opening in the perineum in front of the usual anal site or in the vulva (fig. 3). If such an orifice is enlarged by a simple midline episiotomy, followed by dilatation, continence is regularly acquired. If transplantation is required to a more normal position this is better deferred till about four years of age: it is useful in some, mainly to achieve an easier position for wiping, but is not necessary to obtain continence.

Rectal agenesis, in which the bowel stays above the pelvic floor, is a much more difficult condition. The bowel usually ends with a small opening into the vagina or male prostatic urethra. In these the urogenital sinus has failed to differentiate so that a cloacal condition persists in which the urinary, genital and alimentary tracts join internally. The termination of the bowel is often so small that it blocks, or occasionally it is truly imperforate. Major surgery is needed to bring the bowel through the pelvic floor in front of the levator sling, either at once or later following a primary colostomy. The results are poor. About one-third die of associated abnormalities, and the others are usually incontinent to a varying degree until old enough (about six to eight years of age) to cooperate in a voluntary defæcation regime, perhaps with the help of enemas, so that an abnormal but socially acceptable continence is usually achieved.

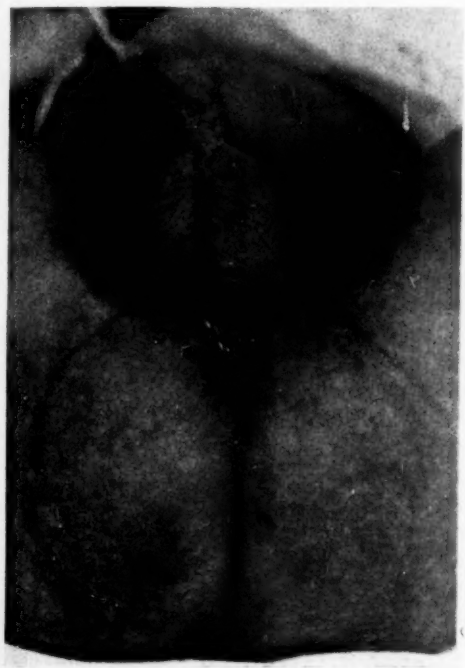

FIG. 2.—Covered anus. Meconium is discharging from a small orifice in front of the epithelial excrescence which covers a normal anus.

At least a third of ano-rectal anomalies are associated with urogenital defects although most of these are unimportant (e.g. duplication of a kidney) or treatable (e.g. hydronephrosis). Sacral agenesis is not uncommon and the neurological deficit jeopardizes continence. Congenital heart lesions are also associated and œsophageal atresia occurs often enough to justify the passage of a catheter into the stomach in each case to exclude the defect (Browne, 1955; Nixon, 1959).

GENITO-URINARY DEFECTS

Hypospadias.—The penis is flexed ventrally and the urethral opening lies proximal to its usual site. Cases are sometimes referred urgently on suspicion of absence of the urethra, which is excessively rare. One may have to wait over twenty-four hours for the passage of urine as in a normal baby but careful inspection of the ventral surface of the penis and particularly the peno-scrotal junction will reveal the inconspicuous meatus. Treatment is reliable and is not urgent. It is usual to correct the flexion of the penis at eighteen months and construct a urethra to the tip at four years of age so that the boy passes water standing up before going to school.

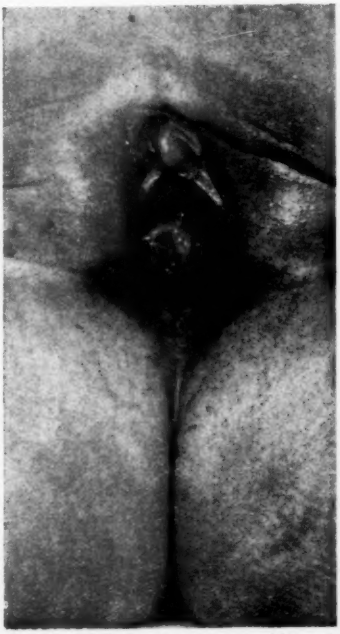

FIG. 3.—Vulval ectopic anus. Normal continence is achieved by making the opening large enough to work where it lies by a 'cutback'.

Ectopic bladder is less common and is a serious abnormality. The 'standard' treatment has been transplantation of the ureters to the colon and excision of the defective bladder, but poor long-term results have been achieved: about 30 per cent. having nocturnal incontinence, 30 per cent. dying of ascending infections before adult life and 30 per cent. having recurrent illness from urinary infections. Transplantation into an isolated loop of ileum reduces the infection risk, but attempts to reconstruct the bladder are reasonable for the structures are all present although cleft ventrally in the midline in the splayed out pelvis. Pelvic osteotomies have been used recently to close the pubic gap and facilitate repair and I have performed four neonatal closures when the elasticity of the skeleton allows closure without formal open osteotomy. The real problem, however, is not closure of the bladder; it is the formation of a competent sphincter. This has rarely been achieved, but such efforts do not interfere with later transplants in the usual manner if necessary; they achieve a good plastic repair of the defect which is needed in any case, and they alleviate the misery of the infant with a sore exposed ectopic bladder. With further experience continence may be achieved in a higher proportion.

The most serious defects of the urogenital system presenting in the neonatal or infant period are those due to bladder neck or posterior urethral obstructions with progressive back pressure destruction of the kidneys. Their onset is insidious and the child remains deceptively well with a

mounting blood urea. Dribbling and the absence of a good stream may be important clues. A new-born baby passes urine often and automatically, but he should not be always wet, and dribbling micturition merits prompt investigation. The passage of a catheter should only be performed for cystography on the operating table ready to proceed to treatment, for infection without relief of the obstruction may be fulminant in its effects.

Adherent labia are not uncommon. The condition is often mistaken for vaginal atresia and unnecessary alarm is raised. The perineum appears to present only one small orifice behind the clitoris from which the urine is ejected (often forwards in male fashion). But careful scrutiny reveals a fusion mark down the midline. Pressure backwards with a glass rod will separate the raw surfaces and the daily application of yellow soft paraffin B.P. for fourteen days will prevent re-adherence.

SIGNS OF INTERNAL ANOMALIES

Frothing.—The production of excessive mucus in the pharynx—often blown out in bubbles around the lips—should give rise to immediate suspicion of the presence of œsophageal atresia. This can be confirmed or refuted simply by passing a soft rubber catheter, about size 10, through the mouth. If atresia is present the tube will stick 4 inches (10 cm.) beyond the gums. It is better not to use a smaller tube or it may coil up in the pouch giving a mistaken impression that the tube has gone farther down. Transport to a pædiatric surgical centre should be arranged forthwith. Delay for x-rays and particularly the potentially hazardous use of contrast media is unhelpful. Aspiration of the blind pouch at quarter-hourly intervals, and as needed, should be continued throughout the transfer. With this attention prolonged journeys are well withstood. The usual atresia is at about the level of T_4 and the lower segment of the œsophagus opens into the trachea about its bifurcation. This tracheo-œsophageal fistula allows backflow of irritant gastric juice into the lungs. The baby should therefore be nursed head up. With prompt operation on a mature baby with this type of atresia and no other abnormality successful primary repair should be achieved in about 90 per cent. of cases, but 40 per cent. of œsophageal atresias arise in babies who are either markedly premature or have some other serious anomaly (congenital heart lesions and ano-rectal anomalies being the commonest). The outlook is then much worse.

Cyanosis and choking on attempted feeding will arise later but these signs should not be seen if the significance of excessive mucus is appreciated.

Cyanosis, persistent or in attacks, has many causes including inhalation of liquor amnii, hyaline membrane, cerebral birth trauma, congenital heart disease and, from a few days after birth, staphylococcal pneumonia with cyst formation or pneumothorax, but diaphragmatic hernia must be considered in every case because treatment is so urgent. The entire small intestine may be in the chest and distension with gas can collapse both lungs in a matter of hours or even minutes. Physical signs in the chest may be confusing

due to transmitted sounds but the abdomen is suspiciously empty and the heart displaced so that dextrocardia may be mistakenly diagnosed. A prompt straight x-ray confirms the diagnosis (fig. 4). Oxygen may be needed during transport to hospital but cannot help if tensely distended coils of intestine hold the lungs down. Operation to get the gut out of the chest is one of the most urgent neonatal emergencies. Treatment is very successful if carried out in time. Temporary improvement must not lead to delay for a crisis may arise at any time.

Acute cardiac illness in the first weeks of life is usually due to a severe malformation of the heart which cannot be corrected, but the position is not hopeless. For example, failure at this time may be due to an eminently correctable patent ductus arteriosus or coarctation of the aorta. Since failure may be precipitated by a pulmonary infection, in every case treatment should begin with antibiotics, as well as digoxin, oxygen and morphine as required for the cardiac lesion.

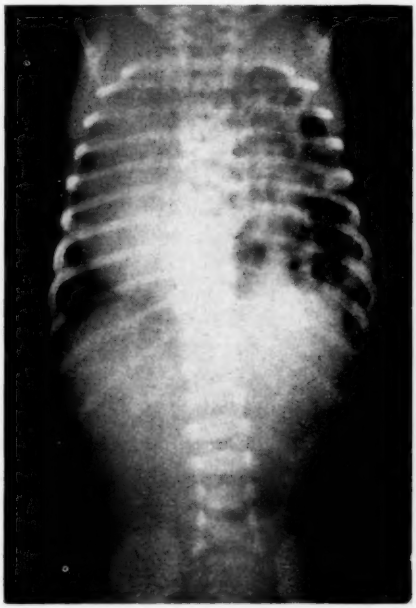

FIG. 4.—X-ray of congenital hernia through a defect in the left dome of the diaphragm. Showing bowel shadows in the chest displacing heart and collapsing both lungs. Paucity of bowel shadows in the abdomen.

Green vomit in the newborn must be considered as due to intestinal obstruction until proved otherwise. Many babies vomit and the vomit may be coloured yellow from carotene pigments rich in the colostrum milk, but green, truly bile-stained vomiting is very rare in the absence of organic cause (Nixon, 1955). The three likely causes are mechanical obstruction, cerebral trauma during parturition causing neurogenic ileus, and infection also causing a functional ileus. Infection need only be considered after the first few days of life, but complete organic obstruction causes vomiting within twenty-four hours in almost every case and so may cerebral trauma. There may be other signs—flaccidity, irritability, fits, irregular respiration, tense fontanelles—to suggest cerebral trauma, but the crucial investigation is a straight x-ray of the abdomen in the erect position. Fluid levels in the gut are normal at this age, but fluid levels in progressively dilating coils of bowel are evidence of organic obstruction. Fluid levels in an evenly dilated bowel throughout the abdomen are evidence of functional obstruc-

tion or of air swallowing from much crying. Transport to a surgical centre will be well withstood if gastric aspiration is instituted and continued during the journey. The chief danger is the aspiration of vomitus into the lungs.

Louw (1960) reports a survival rate in neonatal emergency operations of 80 per cent. with operation on the first day of life, and 57 per cent. on the second, coming down to 17 per cent. after the sixth day.

No attempts should be made to force feeds on a reluctant baby until obstruction is excluded. Mothers and nurses are liable to be anxious about

FIG. 5.—(a) A small premature baby after operation for duodenal atresia with annular pancreas. Moist atmosphere, gastric suction and lateral position maintained to minimize the dangers of pulmonary complications by aspiration of vomit or inspissation of mucus. (b) The baby (on the left) at eight months with her normal twin whose weight she just exceeds (Nixon, 1960.)

missed feeds but the baby will come to no harm from a day or two without milk and the hazards of inhalation into the lungs are considerable.

GASTRO-INTESTINAL OBSTRUCTION

Only the four main groups will be discussed here. There are probably about 500 such cases in the country each year.

Atresia of the duodenum (fig. 5) is associated with mongolism in about a third of the cases. The survival rate is around 75 per cent. Jejuno-ileal atresia is fortunately not associated with mongolism and other defects outside the alimentary tract are uncommon: 75 per cent. success may be achieved. A few multiple atresias leave so little bowel that survival is impossible. Atresia causes green vomit in the first day of life except in duodenal atresia with obstruction above the ampulla of Vater. In such cases the persistence of vomiting should lead to diagnosis. Distension and constipation are later in becoming obvious and one must not be deterred from prompt x-rays because the baby looks deceptively well. They remain so until vascular damage supervenes in the distended bowel walls during the third or fourth day of life and then collapse may be rapid. *Malrotation* causes

duodenal obstruction by bands across the duodenum or by volvulus of the midgut loop or both. The obstruction is usually present at birth but may arise later and may be intermittent. Treatment is particularly urgent because of the danger of strangulation in the midgut loop. In the absence of such irreversible and extensive bowel damage the outlook is excellent and derotation of the gut by Ladd's operation saved 13 out of 17 in one series (Nixon, 1956).

Meconium ileus is due to inspissation of the abnormal mucus which causes neonatal obstruction in 15 per cent. of babies with mucosis (cystic fibrosis). The meconium may be so thick that fluid levels cannot be seen on x-rays; instead, the mottled 'meconium shadows' may be seen. At Great Ormond Street the obstruction was relieved in about half of a series of 60 cases investigated by Bodian; yet only seven remain alive. The others have mainly succumbed to staphylococcal chest infections complicating the pulmonary lesions of this generalized disease.

Hirschsprung's disease is now a relatively common cause of neonatal obstruction as the early course of this disease is becoming widely recognized. It seems likely that many used to die incorrectly diagnosed. The usual case has an aganglionic segment of bowel extending from the anus up to the lower sigmoid colon and thus presents with a low colonic functional obstruction. Distension of the abdomen, even to the extent of embarassing respiration, may precede vomiting. Rectal examination may be followed by the passage of meconium and a lot of wind. This deflation may be followed by a period of apparent normality, or recurrent obstruction may soon occur. The baby should certainly be in hospital in experienced hands until the aganglionic bowel is resected or colostomy performed. His condition can deteriorate exceedingly rapidly and the use of enemas is dangerous: they are usually ineffective and if not returned fatal water intoxication may result from their rapid absorption from the dilated colon above the aganglionic segment. Swenson's type of resection (Swenson and Bill, 1948) is the only operation to date which has reached the stage of showing good results on a five or more years follow-up of a large series, but much interest is now being shown in Duhamel's (1960) ingeniously simple operation, the early results of which are good.

Hypertrophic pyloric stenosis is a well-known cause of projectile vomiting which usually begins in the second or third week of life. It is not so widely recognized that œsophageal hiatus hernia may cause projectile vomiting at this age. There will usually be an earlier onset of vomiting than in pyloric stenosis and perhaps a characteristic history of small hæmatemeses in the first few days of life.

OBSTRUCTIVE JAUNDICE

Obstructive jaundice in early infancy is worthy of note. Atresia of the bile ducts is the commonest cause. Surprisingly, the jaundice is not usually evident until two or three weeks have passed: i.e. beyond the period of the physiological jaundice. Unfortunately only about one in ten cases has an

extra-hepatic segment of the bile ducts suitable for anastomosis. Almost as common as atresia is neonatal giant-cell hepatitis. Because hepatitis may resolve there has been a reluctance to subject these babies to the hazards of early exploration. As a result, many of the operable atresias are only found at a stage when irreversible cirrhosis makes long-term survival impossible. Clatworthy and McDonald (1956) put forward a scheme for early (four to six weeks) limited laparotomy for liver biopsy and cholangiography. Only if these examinations confirmed the presence of atresia or other operable lesion (e.g. choledochus cyst) was wide exploration undertaken. Such a course appeared to offer the best chance of saving the atresias without increased risk to the hepatitis. The recent report of Cameron and Bunton (1960) of a successful repair of atresia at two months with resolution of cirrhosis is encouraging but one happy experience should not lead to complacency. At last year's International Congress of Pædiatrics, Clatworthy and Santulli both reported series of operated atresias in which about one-half of the long-term results were unsatisfactory owing to established cirrhosis. My personal experience in 35 explorations for obstructive jaundice in infancy makes me support their plea for early diagnostic laparotomy. One choledochus cyst, one stenosis of common bile duct, one operable atresia (very recent) were found and treated at a time when minimal cirrhotic changes make long-term survival likely, but one other choledochus cyst and two anastomosable atresias were operated in the third or fourth months of life and died of hepatic insufficiency.

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HÆMOLYTIC DISEASE OF THE NEWBORN

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About 0.5 per cent. of all pregnancies in this country involve a fœtus affected by hæmolytic disease. Of 100 affected fœtuses 15 will be stillborn, and 85 born alive. Of the latter about 40 per cent. will be mildly affected and require no treatment; the remaining 60 per cent. will require one or more exchange transfusions, but if this treatment is correctly applied at least 95 per cent. of all live-born babies will survive (Walker, 1959). At present, however, the mortality for this country as a whole is distinctly higher than in centres where many babies are treated, so that it has been estimated that 200 babies die needlessly each year in England and Wales (Walker and Mollison, 1957).

The major problem today is thus seen to be that of the large number of affected fœtuses which die *in utero*, although a worth-while improvement in the numbers surviving after birth would be achieved if existing knowledge and techniques were applied to all babies. No method has yet been discovered for reducing the harmful effects of maternal antibody upon the fœtus, so that the only means at our disposal for mitigating these effects is to shorten the period during which the fœtus is exposed to antibody: i.e. to induce labour prematurely, with the added risks to the baby from causes other than hæmolytic disease that this may entail.

ANTENATAL PREDICTION

Antenatal prediction of hæmolytic disease is essential in order that the optimal time and place of delivery can be arranged, and a sample of cord blood be collected at birth. To this end: (1) every mother should have her blood tested in early pregnancy to determine her Rh group if it is not already known. (2) All Rh-negative mothers should be re-tested for antibodies in each pregnancy: ideally this should be done at about 32 weeks. This date is somewhat earlier than the 34 to 36 weeks often advised in the past, and reflects the greater emphasis on early induction for severely affected babies.

Rh-antibody has previously been measured in terms of its power to *agglutinate* Rh-positive red cells. Although it has always been recognized that there was some correlation between antibody titre thus measured and severity of hæmolytic disease in the fœtus, prediction of severity was insufficiently reliable to be of much help in the individual case. Kelsall and

his colleagues (1952, 1958), in Western Australia, first showed that a much more reliable prediction could be made if antibody were measured in terms of its ability to *sensitize* Rh-positive red cells, sensitization being detected by means of the anti-globulin test (indirect Coombs test). Their pioneer work has recently been confirmed, extended and simplified by Tovey and Valaes (1959) in Bristol. These workers showed that different levels of antibody are critical according to whether or not the mother has previously carried an affected baby, presumably because, if she has done so, the fœtus is exposed to antibody throughout the pregnancy.

First affected babies.—The Bristol workers found that with first affected babies there is little risk of stillbirth when the anti-globulin titre is not above 1:20. At higher titres of 1:40 or more the risk of the pregnancy ending with a dead baby is as follows:—

Duration of pregnancy	*Risk of death*
At 36 weeks or before	Less than 5 per cent.
Over 37 weeks	20 per cent.

In the light of these figures it is suggested that in the case of first affected children, when the maternal titre reaches 1:40 or more the baby should be delivered about twenty-one days before term. If this is done, about two-thirds of the stillbirths in first affected cases should be prevented.

Subsequently affected babies.—Two factors here enter into the prediction of severity: (1) the length of time the fœtus is exposed to antibody, and (2) the titre of antibody. At present it is difficult to quantify this statement to express the risk of stillbirth at various gestational ages, and it is necessary to rely on a combination of (1) the degree of involvement of previously affected babies, (2) the maternal antibody titre at that time, (3) the antibody titre in the early stages of the present pregnancy, and (4) the antibody titre as pregnancy proceeds.

Thus, if the previous baby was only mildly affected, and if antibody has not risen appreciably since that time, delivery at term is advised. Should the previous baby have been moderately affected, necessitating treatment, and the titre in the present pregnancy be in the 1:10 to 1:20 range, premature delivery at twenty-one days before term may be advised, because in these circumstances there is otherwise a risk of about 10 per cent. that the pregnancy will end with a dead baby.

Should the titre be 1:40 or higher, the risk of an affected fœtus failing to survive is great—about 1 in 3—and most of these deaths will occur before the 37th week. In such cases, and if the father is *homozygous*-positive, delivery thirty-five days before term is advised. Delivery earlier still may be justified when a previous baby has died at or before this gestational age. When the father is *heterozygous*-positive, a lack of substantial rise in antibody as pregnancy proceeds will suggest that the fœtus is probably Rh-negative and hence unaffected, and this will greatly influence decision as to early induction.

METHOD AND PLACE OF DELIVERY

Method.—Surgical induction, followed sometimes by an oxytocin drip, is the accepted method of inducing labour prematurely. There is much to be said for adopting the same method to achieve delivery near term in those cases in which term delivery is decided upon. The baby can then be delivered at a time when medical, nursing and laboratory staffing is optimal, and when a supply of fresh donor blood can be assured. Surgical induction before 36 weeks will occasionally fail to induce effective labour, so that the obstetrician may find himself forced to undertake Cæsarean section with its inevitably slightly increased maternal risk. This factor adds to the already painfully difficult decisions involved in the management of some of these cases.

Place.—The freer use of premature induction results in a larger number of seriously affected babies who are also premature. The proper medical and nursing care of these babies is often arduous, and can only be carried out in a centre properly equipped for the task, with adequate laboratory cover, and with proximity to a blood bank.

ASSESSMENT OF THE BABY AT BIRTH

Bile staining of the liquor amnii, jaundice of the cord, obvious anæmia and hepatosplenomegaly are all pointers to severity of involvement. Jaundice, however slight, appearing within the first few hours is a further sign of severity. In most instances, however, examination of the cord blood is necessary to provide the data for assessment. A positive Coombs test confirms that the baby is affected, and, if so, an exchange transfusion is indicated if the hæmoglobin level is low and/or the bilirubin level is high. Suggested criteria for transfusion are:—

(1) Cord hæmoglobin 14 g./100 ml. or less

(2) Cord hæmoglobin 14 to 16 g./100 ml., if the bilirubin exceeds 3 mg./100 ml.

With increasing reliance on the maternal anti-globulin titre as an index of severity we are tending to place much weight on this as a guide to the need for exchange transfusion, thereby allowing some babies to remain untreated who by past standards would have been transfused.

DONOR BLOOD FOR EXCHANGE TRANSFUSION

Some have recommended using heparinized blood from a donor bled just before the blood is required. In most centres, however, bank blood is used. Two bottles of group O Rh-negative blood are cross-matched with the mother's serum shortly before the baby is delivered. This method allows full time for cross-matching, and ensures that blood is ready when the baby is born. The blood should be as fresh as possible and in any case not more than five days old, since as the age of stored blood increases: (1) the proportion of transfused red cells rapidly removed from the circulation within

the first day or two rises, thereby increasing the tendency to hyperbilirubinæmia, and (2) the potassium level in the plasma rises, which in turn may raise the recipient baby's plasma-potassium level unduly.

Owing to dilution with the citrate anticoagulant, bank blood contains only about 11 g. of hæmoglobin per 100 ml. After allowing the cells to settle, two-thirds of the supernatant plasma should be sucked off. This will raise the hæmoglobin level to about 15 g. and allow the baby to be left with this level at the end of the transfusion. Further, the baby will receive much less citrate and also less potassium.

TECHNIQUE OF EXCHANGE TRANSFUSION

It is not intended to describe this fully here, but only to list a number of practical points. Exchange transfusion should be regarded as a major operation with an appreciable mortality, which is kept to a minimum by the sensitivity of the operator to a large number of details, not all of which can be easily defined, but which in sum seem to account for the variations in mortality from this disease already mentioned.

The colour, breathing and heart rate of the baby should be continuously monitored throughout the operation. This requires the whole attention of one observer. Even slight deterioration in the baby's condition should be taken seriously and the procedure halted—if necessary for half-an-hour or more if, as often happens, the baby improves thereby. The team of three is completed by an assistant whose job is to keep accurate tally of the volume 'in' and 'out'.

Every precaution should be taken to prevent air entering the system, air embolus being an occasional disaster that many centres have experienced. Pertinent points are:

(a) The apparatus must be leak-free.

(b) The transparent umbilical catheter must be constantly watched for air bubbles, which if seen should be sucked back into the syringe.

(c) The initial introduction of the umbilical catheter must be made with a syringe attached, lest air be sucked into the vein.

(d) The catheter should be inserted no farther than is necessary to allow blood to be aspirated freely, since if its tip reaches the inferior vena cava above the diaphragm it will lie in an area of negative pressure and air is more liable to be sucked in.

(e) Once the catheter is in position a ligature should encircle the umbilical stump, to prevent air passing down the side of the catheter.

The specially made umbilical catheter with rounded tip and correct degree of flexibility has greatly facilitated the procedure (obtainable from Edwards Surgical Supplies, 289 City Road, London, E.C.1). A three-way tap, of glass, is available for the purpose and may be obtained from Camlab Glass Ltd., Milton Road, Cambridge. The syringe of 10 or 20 ml. (I prefer the former) should be of the type with metal plunger, with accurate fit throughout its range.

Dead space should be kept to a minimum; even so it will probably amount to

about 1 ml., as the capacity of the catheter is nearly this. Thus, with a 20-ml. cycle, the effective blood exchange will be only 95 per cent. of that recorded.

The volume exchanged (corrected for dead space) should usually be equal to twice the baby's blood volume: i.e. it should be 80 ml./pound (175 ml./kg.) body weight; this will result in the baby being left with 5 per cent. of his original red cells. It seems reasonable to expect that injecting and aspirating blood *slowly* should be safer; arbitrarily, two hours is the time we aim to take to complete an exchange of this volume. With an average-sized child this is equivalent to taking one minute to aspirate or inject each 10 ml. of blood. In order to counteract the tendency for the citrate injected to lower the level of ionized calcium, 1 ml. of 10 per cent. calcium gluconate is injected for every 100 ml. of blood exchanged.

MANAGEMENT OF VERY SEVERE CASES

The following case, which was under the care of Dr. Janet Roscoe who kindly allows quotation, illustrates how exchange transfusion may need to be modified in particular circumstances. It also illustrates that when the delivery of a very seriously affected baby is anticipated, it is worth while to have everything ready to start the operation as soon as the baby is born.

The mother's previous baby had been seriously affected and had needed two exchange transfusions. The father was homozygous-positive. The mother's antibody titre was at a high level from the outset of this pregnancy. These three facts made it certain that this baby would be extremely severely affected and labour was therefore induced at 36 weeks. The operator was scrubbed-up with the apparatus for transfusion complete before the baby was delivered. This proved to be a gross hydrops fœtalis weighing 5 pounds 10 ounces (2.5 kg.), with generalized œdema and an enormously swollen abdomen. A trocar inserted into the abdomen forthwith enabled a large quantity of bile-stained ascitic fluid to escape under pressure. The cord blood hæmoglobin was 2.9 g./100 ml., bilirubin 8.2 mg., and normoblasts 97,000 per cu.mm. At twenty-five minutes the umbilical catheter was inserted, and the venous pressure found to be raised at 10 cm.

During the first hour a total of 50 ml. blood was removed, but only 10 ml. replaced by means of a slow drip, since if blood was injected the precarious state of the baby visibly deteriorated. By six hours 260 ml. blood had been removed and 210 ml. given by slow drip and the baby's condition had now improved a little, allowing the exchange to be finally completed by eight hours, with 575 ml. out, 530 ml. in.

After many vicissitudes this baby finally began to thrive and at seven months appeared to be a normal baby. She then died suddenly from a fulminant *H. influenzæ* meningitis.

HÆMOLYTIC DISEASE FROM ANTIGENS OTHER THAN RH

Certain rare factors, such as Kell, occasionally cause hæmolytic disease, but the only common antigens encountered, apart from Rh, are A and B, when one of these antigens is carried by the baby but not by the mother. The commonest finding is that the mother is group O and the baby group A, with the mother carrying α-hæmolysin in her serum. These cases present as jaundice appearing early (any baby showing jaundice in the first twenty-four hours is abnormal and should be investigated) or in severe degree. The

Coombs test on the baby's red cells is often very weakly positive, but unfortunately there is as yet no simple and reliable serological test for ABO-hæmolytic disease, so that the diagnosis cannot be as clear-cut as in Rh disease. The practical importance of ABO-disease is that it can cause severe hyperbilirubinæmia and hence kernicterus.

THE MANAGEMENT OF HYPERBILIRUBINÆMIA

It is now accepted that the most important single factor in the development of kernicterus is a high level of bilirubin (in 'indirect' or unconjugated form), and that if the plasma bilirubin level is kept below about 20 mg./100 ml. this complication can be almost eliminated.

Even after an exchange transfusion there may be a rapid rise in the bilirubin level, due to hæmolysis of the 5 per cent. or so of the baby's Rh-positive cells still remaining, together with those added subsequent to the transfusion from hyperactive erythropoietic tissue. A simple gadget, the perspex 'icterometer', described by Gosset (1960), and obtainable from Thomas A. Ingram, Santon Works, Prescott Street, Birmingham 18, aids clinical evaluation of jaundice in terms of plasma-bilirubin level. A second exchange transfusion is indicated if the bilirubin level appreciably exceeds, or is rising at such a rate that it clearly will exceed, the critical level of about 20 mg. This principle is easy to enunciate; its application in practice is far different, because few laboratories claim an accuracy of more than 10 per cent. in bilirubin estimations, whilst it is impossible to predict when an individual baby will start to eliminate his own bilirubin and so rapidly render a potentially dangerous operation unnecessary.

In hyperbilirubinæmia due to ABO-incompatibility, the baby is exchange transfused with group O blood, cross-matched (as always) with the mother's serum.

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AN ORAL TREATMENT FOR TRICHOMONAL VAGINITIS

AN EVALUATION OF METRONIDAZOLE

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In the past, treatment of trichomonal vaginitis has been by local applications of innumerable drugs. Oral trichomonacides previously on the market have proved of little value. A requisite for successful treatment must be a drug which is active systemically, in order to eradicate the organism in women from its foci in the urethra, Skene's glands, Bartholinian glands, racemose glands of the cervix and even possibly the uterus and Fallopian tubes. The male partner must also be treated, as the trichomonad may penetrate into the bladder, prostate gland, and possibly the seminal vesicles. That such a treatment is now available, although possibly not yet perfected, is evident from recent reports (Durel *et al.*, 1959, 1960; Rodin *et al.*, 1960; King, 1960), recording the results obtained with a new preparation known as metronidazole ('flagyl'), which is a nitro derivative of imidazole, with the formula: 1-β-hydroxyethyl-2-methyl-5-nitroimidazole.

SCOPE OF PRESENT INVESTIGATION

In this article we report the results obtained in 106 female cases, under observation for a minimum of two weeks and a maximum of eight months and treated with oral tablets (200 mg.) of metronidazole.

The cases were chosen from those attending clinics at the Royal Infirmary, Edinburgh, the Bruntsfield Women and Children's Hospital, the Elsie Inglis Maternity Hospital, Edinburgh, and the Victoria Hospital, Kirkcaldy. They were specially picked because it was felt that they would cooperate and attend regularly for observation. Patients with leucorrhœa in pregnancy were included because a trichomonal infestation is common and when this survey began none had been treated with this preparation. Each patient was asked to refrain from sexual intercourse for six weeks. No other treatment was allowed except washing and powdering with a baby powder.

An analysis of the 106 cases showed 50 married women, 50 single and six widows or divorcees. There were 44 multiparous and 62 nulliparous patients, and 10 of the 18 pregnant patients were unmarried. Sixteen known prostitutes were included. The oldest patient treated was 56 and single, the youngest a schoolgirl of 9 years. The highest incidence (i.e. 74 cases,

almost two-thirds of the total) was in the age-groups of greatest sexual activity: 18 to 35 years.

Procedures.—A general medical and social history was taken in every case, followed by a physical examination, including blood tests for Wassermann reaction, Kahn test and gonococcal complement fixation test. A careful genital examination was then carried out. Routine films were taken from urethra, vagina and cervix, and from Skene's ducts, Bartholin's glands, or the rectum when required. Cultures were taken from the cervix, and in some cases other sites, on to blood agar medium to eliminate a gonococcal infection. In a number of cases discharge was collected from the urethra and vagina and trichomonads were cultured in Feinberg and Whittington's medium, or vaginal discharge was plated on 4 per cent. glucose agar slopes for the determination of the presence of yeasts. In every case vaginal discharge, and, where present, urethral also, was mixed on a slide with saline solution to which 1 per cent. safranin had been added, and examined immediately under 1/6 lens for the presence of active trichomonads. Sometimes slight warming of the slide helped the diagnosis by increasing the motility of sluggish organisms, cultural methods not being required when the wet preparation showed active parasites.

In every case active trichomonads were demonstrated. In 20 cases they were present in both urethra and vagina. There was a concomitant gonococcal infection in 25 cases (23 per cent.). In only one case were yeasts demonstrated at the initial examination.

Dosage.—Three regimes of treatment were adopted:—

(A) One tablet thrice daily for 7 days (21 tablets) in 49 cases.

(B) One tablet thrice daily for 10 days (30 tablets) in 33 cases.

(C) Two tablets four times daily for 5 days (40 tablets) in 24 cases.

RESULTS

An excellent response meant that the patient was symptomatically and microscopically cured. A good result was recorded if the signs and symptoms had cleared up, but the film still showed a few, generally inactive, trichomonads. The follow-up tests in the early part of this survey were done daily. Later we re-examined at 1, 2, 3, 4, 6, 8, 10, 12 and 16 weeks or longer. Occasionally menstruation upset the routine.

Total	2 weeks	4 weeks	8 weeks	12 weeks	16 weeks	5-8 months
106	5	12	26	31	15	17

TABLE I.—Details of follow-up of 106 patients treated with metronidazole.

Of the 106 cases, 64 have been observed for three months or longer (table I). The numbers over a 3-month observation period were limited as many were discharged cured.

From table II it will be seen that the over-all cure rate was 71.7 per cent.

Eighteen cases required a second and five a third course. In three cases there appeared to be no response at all to the treatment. Presumably the organism was drug resistant, or possibly the absorption or drug concentration inadequate, as might occur in a very stout individual or if excretion were too rapid. In 79 cases the parasite had disappeared within one week of starting treatment, often within two or three days. A few of these cases relapsed and required a second course. In 25 cases trichomonads disappeared

No. of cases	Total tablets taken	Excellent result	Good result	Relapse	Reinfection
49	(A) 21	33 (67.3%)	7	6	3
33	(B) 30	24 (80.0%)	5	3	1
24	(C) 40	19 (47.5%)	2	2	1
106		76 (71.7%)	14	11	5

TABLE II.—Results in 106 cases of *T. vaginalis* infection treated with metronidazole.

within the next three weeks. One case took six weeks and one eight weeks to clear up but no further therapy was required. One observation made was that a marked increase of epithelial cells and a thin milky discharge were seen, in both the urethra and vagina, in patients receiving the drug. This was eventually regarded as indicating a good response to treatment.

The number of husbands treated was 16; only six consorts would agree to treatment. The men were treated either because they had a trichomonal urethritis or because they were partners in relapsing female cases. A course of 21 tablets was given and good clinical results obtained. One man maintained that his chronic low backache had also been cured!

Of the 18 women requiring second courses, nine were married and seven of their husbands were treated. Three of these husbands had a trichomonal urethritis and in each of these cases two courses of treatment were required, given simultaneously to husband and wife. Of the nine unmarried girls, only two consorts could be treated, with satisfactory results. Three of these girls have received three courses each, and are still under observation. In two of them spermatozoa were often found in the films.

TOXIC REACTIONS

We were very impressed with the relative absence of side-effects: even in a pregnant woman who consumed 110 tablets in repeated courses. She later had a normal delivery and healthy child. The following reactions were noted:—

Dirty tongue	10 cases
Bad taste in the mouth	4 cases
Nausea	2 cases
Diarrhœa	1 case
Drowsiness	2 cases
Lightheaded feeling	1 case
Abdominal pain with nausea	2 cases

(This complaint was also present during a second course.)

In patients with generalized psoriasis (1), flexural dermatitis (1) and vulval dermatitis (2), there was no exacerbation of the skin condition.

In view of this being a nitro derivative of imidazole more toxicity might have been expected, particularly blood dyscrasias and visceral damage. White blood counts have therefore been carried out in a number of cases but no abnormalities have been found. In two cases complete blood analysis has been done when the patient was swallowing tablets at two-hourly intervals for eight hours. One was thought to be a case of resistance to the drug, and the other of possible intolerance. In the latter case eosinophils were looked for in the vaginal and cervical secretions, but not found.

DISCUSSION

Evidently this drug is an effective systemic treatment for trichomoniasis. It has many *advantages* over treatment with local applications:—

(1) The trichomonads are destroyed in the deep foci as well as disappearing from the discharges.

(2) The simultaneous treatment of husbands and regular consorts prevents reinfection.

(3) Adolescents, or women with vaginal spasm or acute inflammation, may find difficulty in inserting pessaries high enough in the fornices to be effective, and some object to doing so.

(4) The use of oral tablets directs the attention away from the genitalia, and is much more easily supervised in girls' institutions.

(5) When there may be a coexisting gonococcal infection there is greater risk, if pessaries are used, of spreading the infection to others or to the eyes, particularly if the patient has the care of little girls.

(6) Local reactions to various applications are not uncommon: e.g. acute vulvitis or even dermatitis of the inserting fingers. Generalized reactions may occur particularly with acetarsol and gentian violet.

(7) The residual discharge, if any, is usually white and mucoid. This is psychologically important, some forms of local treatment giving rise to coloured discharges which may frighten the patient, or give rise to a gonophobia.

(8) In pregnancy, particularly the late stages, there may be difficulty in inserting pessaries, with the risk of introducing infection.

The *disadvantages* may be summarized as follows:—

(1) There is a certain percentage of failures. Some of these may be due to constant unacknowledged reinfection and could be prevented by simultaneous treatment of the partner.

(2) Some people cannot swallow tablets.

(3) The full therapeutic course may not be completed, or the tablets be taken only erratically. Resistant strains may develop.

(4) Side-effects such as nausea, especially in pregnancy, or a bad taste in the mouth, may make the patient stop the treatment. This latter complaint occurred mainly when the tablets disintegrated while being swallowed.

(5) As a nitro derivative of imidazole, the taking of this drug is not without risk, and every caution should be observed until its safety has been proven. So far no serious reactions have been reported.

No contraceptive effect has been noted. Indeed two pregnancies have supervened during the treatment of two couples. The drug has no effect on the *Treponema pallidum*. When given for forty-eight hours (9 tablets) to a patient with primary syphilis the activity of the treponemes remained undiminished.

No contraindications have so far been noted to the use of this new drug which is still on trial, but it should be given only under strict medical supervision and in courses of not longer than ten days. It is quickly excreted from the body by the kidneys; work being done on pregnant women also shows rapid excretion. In our series, although vaginal yeasts were only found initially in one case, during treatment 25 patients developed such an infection. Only two of these were pregnant. Five cases required treatment, the other 20 being of a temporary nature only. This led us to take routine films and cultures for yeasts in 28 further cases on metronidazole therapy and seven were found positive (25 per cent.). A control series of 49 patients taken at random showed only five positive tests (10.22 per cent.). Among the 10 cases of dirty tongue, yeasts were cultured in three, and these responded rapidly to painting with 0.5 per cent. gentian violet. The remaining seven cases, treated with a borax and glycerin mouthwash, recovered approximately seven days after cessation of the drug. Some patients have complained of vulval moisture after the treatment. This may be due to either the rather active epithelial cell response in the vagina or a residual chronic erosion with an excessive mucoid discharge. Our impression has been that, with the lack of local treatment, healing of a cervical erosion, when present, is somewhat delayed.

The final results in this survey compare favourably with those of previous oral therapy (Pientl *et al.*, 1956; Perl *et al.*, 1956) and the observation periods are longer than those usually reported.

SOME CASE RECORDS

Certain cases were of particular interest:—

Case 1.—A man with a chronic urethritis of 21 years' duration who was responsible for constantly reinfecting his wife. Both were cured when treated simultaneously with metronidazole.

Case 2.—Margaret, a single girl of 34 years, was mentally retarded and from a good home. She was unsuccessfully treated for a trichomonal vaginitis with many preparations over ten years. There was a dramatic response to a course of 30 tablets of metronidazole. A second course was given after menstruation in view of the long history. She remained absolutely clear for five months. Recently she returned from a camp holiday, again showing an acute trichomonal vaginitis. No reinfecting focus could be found and intercourse was denied. Metronidazole again apparently cured the condition. The question of reinfection from inadequate toilet facilities has been considered.

Case 3.—Miss R., aged 56, para 0, menopause at 50 years, came under treatment for latent syphilis and acknowledged intercourse a year previously. She had a very

acute trichomonal vaginitis and in pus pouring from the cervix active trichomonads were often demonstrated. Gonorrhœa was excluded and a course of 30 tablets of metronidazole was given. The clinical response was immediate, although trichomonads did not completely disappear for four weeks. She has remained free from all signs and symptoms for six months. It seems almost certain that she had an intra-uterine infestation.

Case 4.—Mrs. M., aged 28 years, para 5, is now receiving her fourth course of metronidazole because of constant relapse, intercourse being denied. With a view to excluding the possibility of drug resistance she was given five tablets within four hours as an inpatient. Trichomonads disappeared and she completed the course as an outpatient. When she again relapsed spermatozoa were found in her films and she confessed that coitus interruptus was practised. Her husband refuses examination, treatment, or the use of a sheath, but has now gone to the Midlands to work. As all local treatments have failed metronidazole has again been given, for social conditions are poor and there is a risk of infecting her family of young girls.

Case 5.—Pat, aged 9 years, is an intelligent schoolgirl who had been treated elsewhere with sulphonamides and antibiotics because of an intermittent blood-stained vaginal discharge. Hygiene and social conditions were good and she slept alone. She was found to have a trichomonal vulvo-vaginitis. A catheter specimen of urine showed no trichomonads. There was no history of genital interference and her mother's examination was negative. A course of metronidazole was given and within seven days she showed marked clinical improvement and absence of trichomonads. She is still under observation. This is an example of innocent (non-venereal) trichomonal infestation.

SUMMARY

Metronidazole is a new oral trichomonacide of undoubted value. Details are given of a series of 106 cases, with a cure rate of 71 per cent. This could probably be improved if in all cases the partners were treated simultaneously. It appears to be specific for trichomonads.

As it is a nitro derivative of imidazole the risk, particularly to the blood-forming tissues, must be kept in mind. At this stage courses should not be prolonged and should be given under medical supervision.

Pending further investigations it must be used with caution in the pregnant mother, until fœtal risk is eliminated.

The development of resistant strains may be a future problem.

A plea is made that full diagnostic measures be carried out before treatment is given. It must be remembered that a gonococcal or yeast infection may coexist or some other gynæcological condition may be found.

We wish to thank Dr. Robert Lees for his permission to use both male and female cases and for the interest he has taken in the preparation of this report. The help of our house physician, Dr. Leadbitter, has been invaluable especially in the increased laboratory work entailed. May and Baker Ltd., the makers of 'flagyl', have provided a constant supply of the tablets allowing the investigations to be carried out, and have given unstinted advice when called upon.

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A TRIAL OF A LONG-ACTING PENICILLIN TABLET

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A LONG-ACTING preparation of oral penicillin has had favourable reports from several groups of Canadian workers (Malkin, 1959; Grignon and Leboeuf, 1958). Known as 'falapen', it contains 500,000 units of benzylpenicillin in the form of a double-coated tablet, the specially formulated core of which dissolves progressively and is protected by an enteric coating, the outer layer being immediately soluble. Ballon and his colleagues (1958) estimated the blood levels in 24 surgical patients, most of them ambulant, and reported that satisfactory serum levels were maintained throughout the twelve-hour period after the administration of a tablet of 'falapen'.

Examination of their data and the clinical results suggested that the preparation might be particularly useful for casualty cases. It was important to establish just how many ambulant and fully active individuals would still have effective blood levels after a single over-night dose when they reported back the next day. In particular, since earlier experiences with penicillin, both orally and by duodenal tube, in man and in the cat had shown that there were some poor absorbers in the general population (Stewart and May, 1947), it was desirable to find out whether this was a serious disadvantage with this preparation. Finally we were concerned to know whether reactions were more common with this long-acting preparation.

SCOPE OF INVESTIGATION

Selection of cases.—Only very severe cases were excluded. It did not appear justifiable to use desperately ill persons for tests with a preparation new to us. All other cases attending after 18.00 hours on two nights in the week with septic conditions or needing prophylactic treatment because of extensive, dirty or already inflamed injuries which would have received antibiotic treatment or prophylaxis in any case were given these tablets.

Dosage.—The patients were asked to take the first tablet in the evening, to report for a blood test the next day and continue treatment with 1 tablet twice daily for three days for prophylaxis in mild conditions, or for five days for more severely infected lesions.

Blood levels.—These were estimated by a dilution method and by the *Sarcina lutea* method. The latter was the most satisfactory and allows comparison with the previous observations. In any case, the Oxford staphylococcus is no longer a satisfactory organism for use since strains from various centres now vary so widely.

RESULTS

The point most needing amplification was whether effective levels could be obtained overnight in fully ambulant adults. For this only one estimation is necessary. At intervals ranging from ten to sixteen hours a number of individuals reported back for a blood test. Any who had taken their morning doses by mistake were discarded, the others were bled, the levels estimated being recorded singly either as above or below the 0.03 unit level (table I). These

Patients reporting after an interval of	Hours							Total
	10	11	12	13	14	15	16	
Positive blood level	—	4	5	9	9	1	1	29
Negative blood level	1	2	4	4	1	—	—	12
Total	1	6	9	13	10	1	1	41

TABLE I.—Blood levels of penicillin in 41 patients following oral administration of penicillin in the form of one tablet of 'falapen'.

results agree well with Grignon and Leboeuf (1958). It should be noted that investigation has been limited to a single tablet. There was evidence of accumulation of the drug during a course of the tablets and it is probable that results later in the course would appear more favourable.

Clinical results.—These are summarized in table II.

	Satisfactory	Failed
Initially infected lesions ..	44	6
Uninfected lesions ..	8	1*

*Withdrawn from trial by general practitioner.

TABLE II.—Clinical results of use of oral penicillin ('falapen') in 59 patients in a casualty department.

Reactions.—Two patients, not in this series, complained of diarrhœa in the first twenty-four hours and treatment was changed to intramuscular penicillin which was taken without ill effect. They were clearly not sensitive to the drug and this may have been pure coincidence. One patient vomited the tablet. As would be expected, there were failures when patients were given standard treatment before bacteriological investigation had been carried out. The two following are the most outstanding examples.

F.A., a male Asiatic aged 25 years, with cellulitis of a finger, was treated with 'falapen' for three days without improvement. Treatment was then changed to intramuscular penicillin for three days—again without response. The lesion was then incised and pus was found beneath the fibrous sheath. The condition healed in six days without any further chemotherapy.

Maria T., aged 27 years, reported on account of a septic finger attributed to a plastic splinter which she said had been in the finger for four days. The lesion was incised but no splinter was found. Œdema and arthritis of the metacarpo-phalangeal joint of the thumb developed. 'Falapen' did not help, and infection developed at the site of injection of local anæsthetic. Tetracycline was then used after drainage, and the infection cleared.

The remaining failures were: a case of cat bite of the face, a case of otitis externa, one of inflamed tinea pedis, a case of cellulitis of the foot, and one of a burn of the forearm.

DISCUSSION

The advantages of the preparation were forcibly emphasized by the Casualty Sister and the nurses. Were tablets substituted for injections in all but the severe cases and those requiring full investigation for diagnosis and sensitivity testing, the time saved would represent the work of a senior nurse, not to mention a considerable proportion of the output of a syringe service or the labour of a nurse to sterilize the syringes.

The test applied in this trial was particularly stringent and was designed to emphasize any deficiencies in the treatment and, if necessary, to correct any over-optimism in other reports. No advantage was taken of any cumulative effect from a series of tablets so far as blood levels were concerned. Further, the patients chosen were from a group who were all physically active and eating normal food.

The contention that oral penicillin gives fewer reactions than injected penicillin discussed by Ballon and his colleagues (1958) is borne out by this series. It was surprising that no already sensitized patients were encountered and that no reactions were reported by any of them or in over a hundred others treated, since this is in marked contrast to our experience with long-acting preparations intramuscularly when sensitization with some batches and formulations was distressingly frequent—up to 5 per cent.

It is worth noting that the response to treatment appeared to be as good, and obtained as rapidly, as in corresponding cases treated with intramuscular penicillin.

SUMMARY

A new oral penicillin with prolonged action, 'falapen', has been tested on a group of casualty patients. After a single dose the blood levels were still inhibitory to penicillin-sensitive organisms in 75 per cent. of cases tested after intervals of between ten and sixteen hours. The few clinical failures (10 per cent.) in a cross-section of infected casualty cases could have been anticipated with any form of penicillin therapy; in several of them surgery was required. No true penicillin reactions were encountered in these or a further series of over 100 cases. Two patients, however, complained of diarrhœa and one vomited the tablets.

The preparation appears to give suitable cover for minor surgery or for treatment for infections due to penicillin-sensitive organisms if one tablet is taken every twelve hours for three or five days.

Our thanks are due to the Sister and nursing staff of Casualty and to Dr. P. Beighton for their help and to Miss Jean Corse for technical assistance. We are grateful to Duncan Flockhart and Co. Ltd. for the supplies of 'falapen'.

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A NEW TREATMENT OF LEG ULCERS

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ULCERATION of the lower part of the leg is seen commonly in general practice. It can present a real problem to the practitioner, and to the consultant to whom such cases may be referred. It is the aim of all clinicians to improve methods of therapy, and, in this respect, a constant search is being made for new techniques which will speed the healing of leg ulcers. Any improved or new treatment must cure the lesions quickly and painlessly.

The increase of thrombotic disease and the increase in the average age of the population appear to have caused an increase in the number of patients who present with leg ulcers requiring treatment (Horn and Lazarits, 1956). These ulcers occur especially among patients who do much standing, and are more common in women than men. The etiology of leg ulcers is not constant, but it is important that, so far as possible, the underlying cause of the ulcer be determined and treatment planned accordingly.

CLASSIFICATION OF LEG ULCERS

For the purposes of this study, leg ulcers have been classified into three groups, according to the underlying cause: (1) post-thrombotic, (2) gravitational, (3) traumatic. This is the order in which they occur most commonly.

(1) *Post-thrombotic leg ulcers.*—Post-thrombotic leg ulcers develop following mechanical obstruction to the flow of venous blood from the leg. This may be due to superficial or deep-vein thrombosis. Patients who present themselves with these ulcers may give a past history of definite thrombosis, or of phlebitis in the veins of the leg. Some, however, will not admit to such an occurrence, but it can be inferred that such has been the case, or there may be clinical evidence to indicate that this has happened in the past.

(2) *Gravitational leg ulcers.*—Gravitational ulcers are associated with varicose veins, and with incompetence of the valves in the veins of the leg. As a result of venous stasis in the leg, the capillaries in the skin of the lower part of the leg become engorged with venous blood, and, as a consequence, the nutrition of the skin is adversely affected. The skin becomes prone to dermatitis and eczema, and the resistance to trauma and infection is low. As a result, slight injury to this skin may cause ulceration.

(3) *Traumatic leg ulcers.*—Traumatic ulcers are commonest in the lower third of the leg, and usually show the other signs of trauma; or the patient may be able to give such a history. These may be associated with ischæmia, which causes a diminished vascular supply to the skin with deficient nutrition.

This classification, of course, is by no means clear-cut, as the ulcer may be

due to a combination of these factors, and in many cases it is difficult to state that any one ulcer belongs to one class or another. It must be borne in mind that leg ulcers can be associated with diabetes mellitus, hypertension, syphilis, tuberculosis, lead poisoning, paralysis of a leg, or actinomycosis, to mention but a few other diseases. It is therefore essential that the underlying cause should be sought diligently in every case and that, so far as possible, treatment be devised to combat the basic cause.

THE TREATMENT OF LEG ULCERS

At the present time, the treatment of leg ulcers may be either conservative or surgical. It is not the purpose of this article to discuss the surgical procedures, for these are concerned with either radical excision of the ulcer and grafting procedures, or methods aimed at increasing the blood supply to the leg, such as sympathectomy, or a means of overcoming venous stagnation, for example ligaturing and stripping of veins. This study is concerned solely with local therapy. Local medicaments, over the years, have been many and varied. The aim of all these therapeutic agents has been to promote drainage from the base of the ulcer, to promote clean granulation in the ulcer base, and finally to secure rapid epithelization from the edges of the ulcer. In addition, the removal of infection has formed an important aspect of therapy, because it is agreed that a subclinical level of infection may be present as a secondary invader, which causes an added chronicity in the ulcer.

In the early days, at the varicose ulcer clinic at the Homœopathic Hospital, Liverpool, tight occlusive bandaging with 'elastoplast' cured 90 per cent. of cases—given time. The bandage was changed weekly or fortnightly. In those days—twenty or more years ago—ulcers were more commonly of the gravitational type. Closed dressings used in this manner were akin to Trueta's closed plaster of Paris technique for treating compound fractures. The idea was to 'let the legs stew in their own juices, and the fractures or ulcers healed'. Dermatitis developed in some cases following the use of closed dressings. Later, sulphonamide powder was used to disinfect the ulcers, and 'jelonet' and 'ichthopaste' were put under the 'elastoplast'. Success followed these treatments for some years. Still later, came the antibiotics and, with them, Boyd's technique of treating ulcers. Antibiotics were applied topically and this again has been a successful line of treatment. During the search for new topical preparations, a report of the use of silver dinaphthylmethane disulphonate ('viacutan') in treating 103 cases of varicose ulceration was published in 1951 (McAusland, 1951). This preparation proved successful, and has been used in our clinic for many patients. Subsequently a report has appeared on its use for preparing leg ulcers, prior to skin-grafting procedures, and for the conservative treatment of these ulcers (Alánt, 1959).

With the adoption of these topical preparations an essential part of the treatment was efficient pressure applied to the leg, even as it had been

practised with all previous techniques. To secure this pressure, the bandage had to be applied tightly, uniformly and evenly from the toes up to the knee. The bandage itself must have elastic properties so that pressure can be exerted on the leg. In most cases, the patient should be ambulant so that the circulation in the leg is encouraged by muscular action. The necessity for these requirements being fulfilled is an essential part of topical therapy.

Using these techniques, there still remains a fair number of ulcers which do not respond. These ulcers are not deep, and may have been healed to some extent. With some, there remains an area of about two inches by one inch (2.5 cm. x 1 cm.) which will not heal. These ulcers have apparently an adequate amount of granulation tissue at the base, but the surrounding skin will not spread across the defect to close the unhealed area. The granulation tissue is generally of septic appearance, although sometimes the culture of a swab taken from the exudate is sterile. As with all leg ulcers, they are painful and, despite their small size, cause incapacity and distress to the patient.

A NEW TREATMENT FOR RESISTANT ULCERS

Following reports of the successful use of an ointment containing oxytetracycline and hydrocortisone in the treatment of leg ulcers (Downing and Folan, 1956; Heilesen, 1958), it was decided to investigate the effect of an aerosol spray containing these two substances in stubborn cases. This would afford a non-touch technique and would enable delivery with greater access and more penetration than with an ointment. Due to the force of the spray, the medicaments would penetrate through minute collections of serum. In addition, in a large clinic, such as that at the Homœopathic Hospital, where up to 70 patients may be seen at each clinic, the spray would appear to have advantages, because there would be speed in applying the preparation. The medicaments would be applied in a free form, without risk of sensitization of the skin because of the absence of a base. Following the very successful results obtained in healing some of the stubborn cases by the use of the spray applied three or four times daily by the patient, combined with adequate tight bandaging, it was decided to make a further study of the use of this preparation in the treatment of ulcers of the leg, picked at random from those attending the clinic.

SCOPE OF INVESTIGATION

The study, which was conducted at the varicose vein and ulcer clinic of the Homœopathic Hospital, Liverpool, was based on a series of 54 patients (35 women and 19 men). Their ages ranged from 39 to 78 for women, and from 43 to 73 for men.

Treatment.—The spray contained 300 mg. of oxytetracycline and 100 mg. of hydrocortisone in an inert propellant. The spray was presented in a plastic-coated glass bottle, with a plastic actuator. Pressure applied by the finger or thumb to the actuator caused a uniform film of the medicaments

to be deposited on the ulcer. The spray was applied for one second, on each occasion, and the bottle was held about one handspan away from the lesion. This was sufficient to cover even the largest ulcers with a fine film of the spray.

The spray was applied by the patients two or three times daily. After a period of five minutes, a few layers of sterile gauze dressing were applied to cover the ulcer and surrounding damaged skin, and a thin pad of cotton-wool was placed over this. If, at subsequent dressing, the gauze became adherent to the ulcer, it was soaked off by means of a saline solution, which the patient prepared by adding a teaspoonful of common salt to a pint (0.5 litre) of water. If required, a pad of foam rubber—larger than the ulcer but not as large as the pad of wool—was positioned over the wool to give added pressure to the ulcer. The edges were well pared, and the size varied according to the ulcer. A tight and evenly applied elastocrêpe or elastoweb bandage was wound from the toes to the knee. If necessary, two such bandages were used to give complete pressure.

Instructions in the use of the spray, and the correct method of applying the dressings and bandages, were given to each patient by the medical staff, in the first instance, and by means of printed instructions handed to every patient.

Duration of treatment.—Treatment was continued until complete healing had taken place, on clinical grounds. Patients were reviewed at weekly or fortnightly intervals.

Bacteriology.—Swabs from the ulcer exudate were taken on the first attendance at the clinic, and subsequently as deemed necessary on clinical grounds. These swabs were cultured for the organisms present, and for the antibiotic sensitivity of these.

RESULTS

Table I shows the classification of the ulcers treated in this study, and the site of ulceration. It must be emphasized that such a classification cannot

Type of ulcer	Patients treated	Not cured by other means	New cases	Site of ulceration		
				Malleoli		Anterior aspect of leg
				Internal	External	
Post-thrombotic	25	20	5	16	7	2
Gravitational	19	11	8	15	4	0
Traumatic	10	5	5	6	2	2
Total	54	36	18	37	13	4

TABLE I.—Number of patients treated, and sites of ulceration.

be rigid, and in this study the type refers to the predominant underlying cause. Of the 36 patients who had not been cured by other means, 15 had been healed previously for periods of from two to five years. The size of the ulcers treated varied from 4 inches x 6 inches to ½ inch x ¼ inch (10 cm. x 15 cm. to 1.25 cm. x 0.6 cm.).

Table II shows the sensitivity of organisms taken from the exudate in the ulcer base before treatment started. The organisms cultured included *Staph. albus*, *Staph. aureus*, *Staph. pyogenes*, *E. coli*, *Proteus vulgaris* and *B. pyocyanea*. The organisms most commonly cultured were *Staph. aureus* and *Staph. albus*. Sensitivity testing was against penicillin, chloramphenicol, chlortetracycline, oxytetracycline and bacitracin. For the purposes of this study only the sensitivity to penicillin and oxytetracycline has been recorded. It is interesting to note that 55 per cent. of the patients had organisms in the bases of the ulcers which were insensitive to penicillin, whilst 18 per cent. had organisms which were insensitive to penicillin or oxytetracycline.

Type of ulcer	Patients treated	Penicillin		Oxytetra-cycline		Penicillin – Oxytetra-cycline +	Penicillin – Oxytetra-cycline –
		+	–	+	–		
Post-thrombotic	25	14	11	18	7	4	7
Gravitational	19	7	12	17	2	10	2
Traumatic	10	3	7	9	1	6	1
Total	54	24	30	44	10	20	10

TABLE II.—Sensitivity of organisms, from swabs taken before spray treatment.

Type of ulcer	Patients treated	Result of treatment of ulcer		
		Healed	Improved	Worse
Post-thrombotic	25	18	7	0
Gravitational	19	17	2	0
Traumatic	10	8	2	0
Total	54	43	11	0

TABLE III.—Results of treatment of leg ulcers with a spray containing oxytetracycline and hydrocortisone.

Table III shows the results of treatment. Of the 11 patients improved, six had organisms which were insensitive to oxytetracycline. Of the 43 patients healed, four had organisms which were insensitive to oxytetracycline. No ulcers were made worse by the treatment.

The ulcers which were considered to have improved, had clean granulation tissue after treatment, sometimes beneath a scab. In some of these, epithelial growth had been enhanced, but this dipped down to the base of the ulcer like the 'cliffs of Dover'. These ulcers were more than two inches (5 cm.) in diameter, or were deep and 'punched out'. The cure of these ulcers requires either skin-grafting or some agent which will stimulate the growth of the granulation tissue almost to the level of the surrounding skin, so that the epithelium can grow across the ulcerated area.

Of the 43 patients healed, six had relatively deep ulcers. These were

treated by pressure applied to the edge of the ulcer, by means of an oval piece of plastic foam, the centre of which had been removed so that a ring of plastic foam was formed. Pressure applied to the edge of the ulcer in this way caused the granulation tissue to be forced up near to the level of the surrounding skin. The epithelial edges were able to grow across the ulcerated areas in these cases, and healing occurred.

1 (a)

1 (b)

Duration of treatment.—The duration of treatment varied from two weeks to twelve weeks, depending upon the size of the ulcer and the period of time it had been present. One bottle of the spray was usually sufficient for four weeks' treatment, using one application two or three times daily.

In all cases, pain in the ulcers was relieved—in some cases after only two applications. Inflammation was rapidly cleared, particularly in the surrounding skin. Œdema in the tissues adjacent to the ulcer was reduced.

There were no toxic effects from the use of the spray, and no sensitivity reactions occurred.

CASE RECORDS

A typical case healed by this treatment is as follows:—

Mrs. C.J., a shopkeeper, aged 55, with one child, developed noticeable varicose veins about ten years ago, and varicose eczema about six months ago, in the region of the internal malleolus of the right leg. In December 1959, she consulted her own doctor with a small ulcer about ¼ inch x ½ inch (0.6 cm. x 1.2 cm.) in size, 1 inch (2.5 cm.) above the internal malleolus of the right leg. This was treated with penicillin tulle dressings and bandaging.

On January 15, 1960, she attended the clinic with a painful ulcer in this region (fig. 1a) which measured 1½ inches x ¾ inch x ½ inch (3.75 cm. x 1.9 cm. x 1.25 cm.). It was of gravitational type, associated with varicose veins. Bacteriological examina-

tion revealed the presence of *Staph. albus* sensitive to penicillin and oxytetracycline. Spray treatment was applied twice daily from January 15, and tight bandaging was applied from the toes to below the knee. The patient reported that two days after starting treatment the ulcer was no longer painful. She was seen at weekly intervals, and by February 12 the ulcer (fig. 1b) measured 1.2 inches x 0.2 inch (3 cm. x 0.5 cm.). On March 4, the ulcer was very nearly healed, but a fortnight later it had become larger, and it was found that the patient had worn boots which had 'chafed' the ulcerated area, and this had caused deterioration. On April 1, 1960, the ulcer was healed (fig. 1c).

1 (c)

1 (d)

FIG. 1.—Gravitational ulcer in a woman aged 55, showing results of treatment with an oxytetracycline-hydrocortisone aerosol spray: (a) January 15. (b) February 12. (c) April 1. (d) April 22, a week after injection of varicose veins in the ulcer area.

On April 15, varicose veins in the region of the ulcer were injected. At this time the ulcerated area was soundly healed and, when she was seen a week later, it was still soundly healed (fig. 1d) and the veins had been effectively treated.

The following two cases illustrate the relative speed with which leg ulcers respond to this form of treatment.

Mrs. A. T., aged 56, was first seen at the clinic on March 25, 1960, on account of a traumatic ulcer (fig. 2a) which had been present for six months. After a week's treatment the ulcer was healing well (fig. 2b).

Mr. A.W., aged 64, was first seen at the clinic on March 4, 1960, with a gravitational ulcer (fig. 3a) which had been present for seven years. By April 15 the ulcer was healed (fig. 3b).

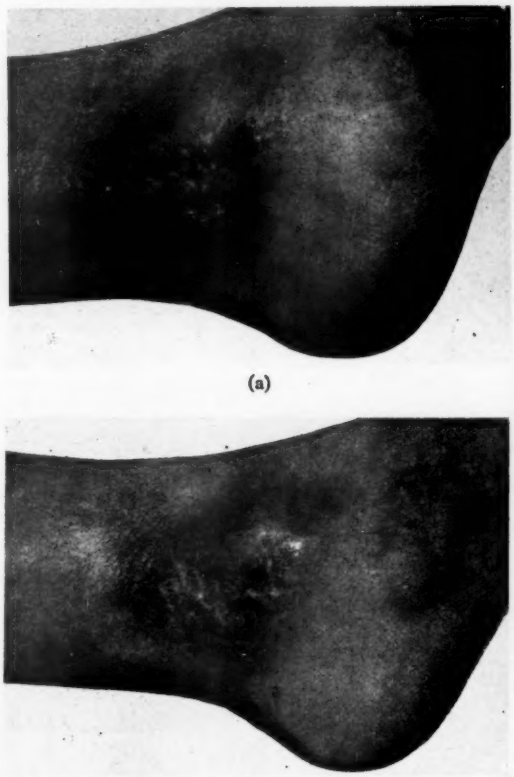
All leg ulcers, however, do not respond completely to treatment. This applies particularly to post-thrombotic ulcers with ischæmia.

Miss E.C., aged 67, is a case in point. She was first seen at the clinic on March 18, 1960, with a post-thrombotic ulcer, with ischæmia (fig. 4a) which had been present for about ten years. The ulcer was deep and more than 2 inches (5 cm.) in diameter. Although healing cannot be expected in such a case, fig. 4b, which shows the ulcer on April 1, after a fortnight's treatment with the spray, demonstrates that the

ulcer base is cleaner and of a more healthy appearance, and that the surrounding skin appears more normal.

DISCUSSION

From the results obtained in this series of patients, it is clear that topical treatment with a spray containing oxytetracycline and hydrocortisone is effective in curing leg ulcers which are septic, not more than 2 inches (5 cm.) in diameter, and not deep or 'punched out'. The spray seems to act extremely well in those cases which are not deeply ulcerated below the surrounding surface, and in cases which have a raw area devoid of epithelium with granulations almost to the level of the surrounding skin. The granulations become clean and epithelium spreads rapidly over them. The surrounding skin inflammation is quickly cleared, and pain is rapidly and considerably relieved. There is a reduction of œdema in the tissues. In the case of deep-seated ulcers, particularly in atrophic legs, the spray cleanses the ulcers and causes a 'scab' to form in the depth of the ulcer. This is not a permanent healing, because granulations do not come up from the depth of the ulcer, and the epithelium does not close the gap in the skin.



(a)

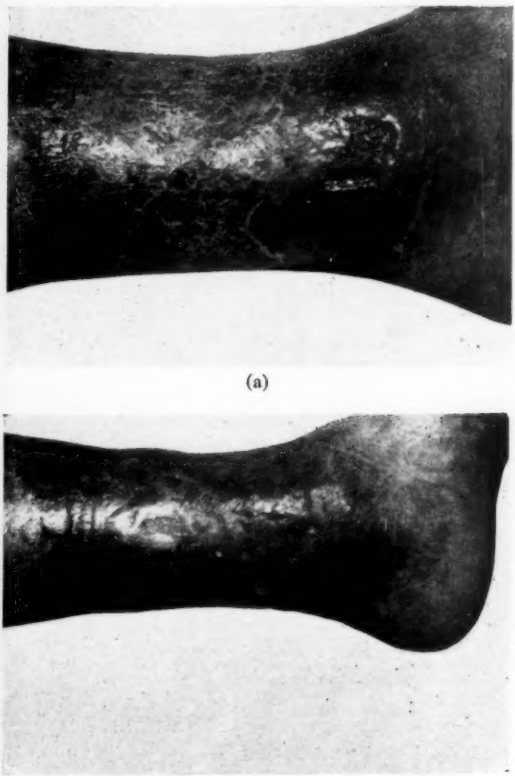
(b)

FIG. 2.—Traumatic ulcer which had been present for six months in a woman aged 56, showing results of treatment with an oxytetracycline-hydrocortisone aerosol spray: (a) March 25. (b) April 1.

It is important that any scabs or necrotic tissue should be removed when the patient attends for review, because this enables the medicaments to come into intimate contact with the ulcerated area. The scab may, in fact, conceal underlying pus. It is also essential that any topical therapy for leg ulcers be

combined with efficient tight bandaging from the toes to the knee. This must be applied firmly and evenly, and exert considerable pressure over the ulcer. Patients must be instructed in the application of the bandages. In this clinic, even the less intelligent patient has been trained, by the medical staff, to apply effective pressure with the bandages.

The exact mode of action of this preparation is a subject of much discussion. A review of the action of corticosteroids on wound healing shows that most of this work relates to the systemic administration of these to animals. Many of these reports state that systemic corticosteroids, in experimental animals, have a delaying effect upon the healing process. Harris (1959), on the other hand, reported that systemic prednisolone had a good effect upon the healing of varicose ulcers, and that, on clinical grounds, the ulcers were healed more rapidly. Hydrocortisone is known to have an anti-inflammatory action. When applied topically, it reduces the amount of exudate in the tissues, and decreases capillary permeability. By this means, local œdema around a leg ulcer is reduced.



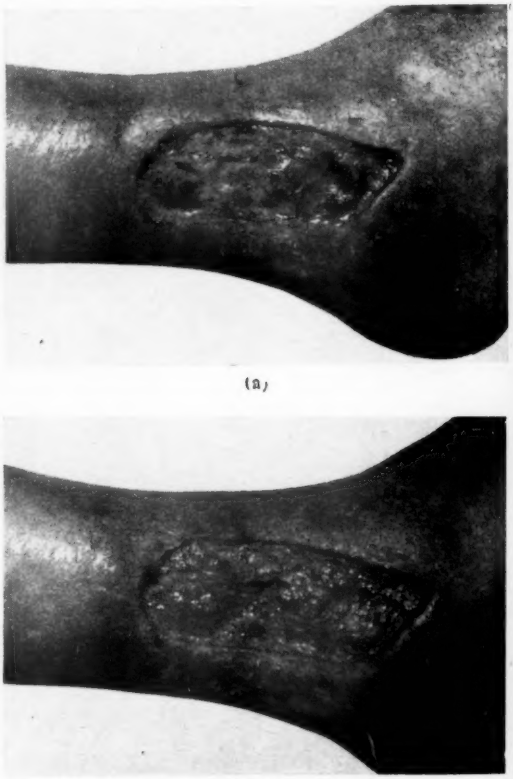
(a)

(b)

FIG. 3.—Gravitational ulcer which had been present for seven years in a man aged 64, showing results of treatment with an oxytetracycline-hydrocortisone aerosol spray: (a) March 4. (b) April 15.

It is recognized that hydrocortisone should not be applied topically to an infected lesion, but when the hydrocortisone is combined with an antibiotic this objection is overcome. The oxytetracycline component of the spray combats existing infection, or prevents its development in the ulcer bed. The broad-spectrum activity of this antibiotic is an advantage when dealing with ulcers which may have a mixed pattern of organisms. The anti-

biotic sterilizes the ulcer, and enables healing to proceed. The anti-inflammatory effect of the hydrocortisone, and the bacteriostatic activity of the oxytetracycline, combined in this preparation, ensure that the ulcer is rapidly cleansed of infection which may be present at a subclinical level, especially in chronic ulcers. It appears, from my clinical observations, that excess granulation tissue is suppressed by topical hydrocortisone, and that the growth of new epithelium, from the edges, is enhanced. This effect was previously noted by Crispoux (1958) when treating burns. Whether this speed of epithelization is due to suppression of excess granulation tissue alone, or to a direct stimulant effect upon the epithelial growth, has not been determined.



(a)

(b)

FIG. 4.—Post-thrombotic ulcer, with ischæmia, which had been present for about ten years in a woman aged 67, showing results of treatment with an oxytetracycline-hydrocortisone aerosol spray: (a) March 18. (b) April 1.

In the present study it has been observed that a bacteriological report of insensitivity to oxytetracycline does not necessarily mean that this antibiotic combined with hydrocortisone will be ineffective. This observation may be interpreted as a discrepancy in sensitivity testing, when dilution tests are not undertaken. Alternatively, it may be that the hydrocortisone has some effect upon the bacteria, so that the oxytetracycline is able to combat the apparently resistant organism.

Wilkins (1959) studied the increased antibacterial activity of neomycin in the presence of certain steroids *in vitro*. He found that when neomycin was combined with the free alcohol and hemisuccinate esters of hydrocortisone, the antibacterial activity was markedly increased against micrococci and streptococci. On the other hand, the antibiotic activities of penicillin, chloramphenicol, chlortetracycline and

erythromycin were not increased in the presence of hydrocortisone. The results of a combination of oxytetracycline and hydrocortisone are not reported.

It has been observed that with deep ulcers the spray is not effective in promoting healing, but it does appear to stimulate the growth of the epithelial edges. These tend to dip down to the base of the ulcer. The granulation tissue at the base of the ulcer, however, develops a more healthy appearance. Generally speaking, it is not effective in treating 'punched out' ulcers. Recently, however, I have treated five cases of 'punched out' ulcers, which would not respond to the spray treatment or any other topical treatment, with a topical preparation of a mono-amine oxidate inhibitor, nialamide ('niamid'). From my preliminary observations it appears that this preparation has a beneficial effect upon the healing of these ulcers. It seems to stimulate the growth of granulation tissue, so that this is raised to the level of the surrounding skin. Many aspects of this preparation require additional investigation, but it would appear, from this preliminary study, that it may be of value in treating leg ulcers which are deep and which do not respond to other therapy.

SUMMARY

(1) An aerosol spray containing oxytetracycline and hydrocortisone has been found to heal some leg ulcers which do not respond to other forms of treatment.

(2) The use of this spray is reported in treating a series of 54 patients with leg ulcers selected at random.

(3) The spray cured the lesions in 79 per cent. of cases, and the new skin has been healthy and of normal texture.

(4) It is emphasized that efficient bandaging, to give tight compression evenly from toes to knee, is an essential part of any topical therapy for leg ulcers.

(5) The use of a new preparation, containing nialamide ('niamid'), for the treatment of 'punched out' ulcers is reported, and preliminary results of this study have given encouragement for further investigation.

It gives me great pleasure to acknowledge the help I have received from my assistants, Dr. B. M. Majka and Dr. H. M. Blaquiere, and from the Outpatient Sister and her staff at the Homœopathic Hospital, Liverpool.

I am extremely grateful to Mr. E. N. Coates, who took all the photographs and who gave valuable assistance in this evaluation.

I also wish to thank Dr. M. C. L. Cox and Miss P. Whitford for assistance in the preparation of this article, and Pfizer Ltd. for supplies of 'terra-cortril' spray used in this study, and for a supply of experimental topical 'niamid'.

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GENERAL PRACTITIONERS' FORUM

A NEW ANTITUSSIVE

By K. D. PHILLIPS, M.B., B.S.
*London, N.W.*10
AND E. W. GUILLAUME. M.B., B.S.
*London, S.W.*5

COUGHS may be divided into two main groups; the dry cough and the productive cough. Either of these may be acute or chronic. Although a cough should be treated on its own merits, it is always desirable to damp down the cough and at the same time not to discourage the expectoration of sputum. The problem in the acute stage is to reduce the cough until such time as sputum may be produced; in the chronic stage, the clinician requires a drug to reduce the cough without impeding the production of sputum.

Drugs for the relief of cough act in two ways: on the cough reflex, either centrally or peripherally, and by increasing the bronchial secretions. In many preparations, one or more of these drugs are combined together with the addition of other drugs such as a bronchodilator or an antihistaminic. The commonest true antitussives that have been used for decades are heroin and codeine. Heroin is now rarely used except in the terminal stages of malignant disease. Codeine and its derivatives, on the other hand, are in general use but have certain drawbacks, such as an analgesic effect, a tendency to digestive disturbance, constipation and occasional habituation. The large number of drugs available to combat cough suggests that a potent antitussive, without side-effects, would be of great value to medicine.

A new synthetic antitussive, 'selvigon', unrelated to morphine or other powerful cough-centre depressants, with the potency of codeine but without its side-effects, has been developed. This article is a report on the clinical trial of the drug in general practice.

PHARMACOLOGY

'Selvigon' is 2-[2-(N-piperidino)-ethoxy]-ethyl 1-aza-phenothiazine-10-carboxylate hydrochloride (fig. 1).

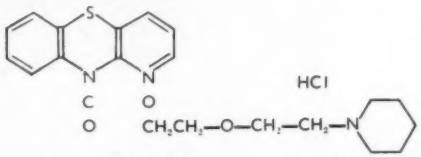

FIG. 1.—Chemical structure of 'selvigon'

In the experimental animal it has been shown that its effect is produced by central depression of the cough reflex. In addition, there is also a mild

antispasmodic activity with bronchodilatation and a mild local anæsthetic activity.

Toxicity.—Preliminary clinical trials indicate that it is non-toxic insofar as there have been no reports of liver damage, or of changes in blood pictures or blood pressures. Neither have any skin rashes been observed and there has been no evidence of addiction or habituation. There are no known contraindications to the use of the drug.

The preparation is available in the form of tablets (20 mg.) and drops (40 mg. per ml.).

SCOPE OF INVESTIGATION

The 77 patients included in this trial were from two busy London practices. They were unselected as to disease, sex or age. Some had coughed for years, others for a day or two only. It is always difficult to assess the severity of a cough and to evaluate the effectiveness of an antitussive. In this trial results were assessed in four groups: excellent, good, fair, and poor.

Excellent.—(a) In acute cases when the cough rapidly diminished and was virtually non-existent within three days. (b) In the chronic cases, when the cough was markedly diminished and sputum more easily produced.

Good.—When the patients definitely benefited by the drug and obviously improved within three to four days of starting treatment.

Fair.—When the patients showed a certain degree of relief of cough, but symptoms continued beyond the three-to-four-day period.

Poor.—When there was no apparent effect.

Evaluation was made over a seven-day period. A record card was completed with diagnosis, brief history and any previous treatment. On the card was also a table for the day-by-day assessment of the severity of the cough. The patient recorded the severity of cough daily on a separate card. Results, with side-effects and comments, were completed by the practitioner. It was therefore possible to compare the patients' response with the clinical evaluation of the practitioner.

Daily dosage.—The daily dosage for *adults* was one to two tablets thrice daily, or 15 to 25 drops thrice daily. A fourth dose was given to some patients before retiring at night.

The daily dose for *infants and children* was:—

Infants.—Three drops thrice daily.
6-12 *months*.—Five drops thrice daily.
Small children.—Eight drops thrice daily.
6-12 *years*.—Ten drops thrice daily.
Above 12 *years*.—Twenty drops thrice daily.

RESULTS

The results are summarized in table I. No side-effects were found in any adult although one discontinued the tablets after three days when her unproductive night cough deteriorated. In three children the drug had to be discontinued. One with pertussis became worse. The other two, who objected to the drug, vomited. Another child developed a maculo-papular

rash of the buttocks, which was almost certainly not related to the drug and was subsiding by the end of the week despite continuation of the drops. Six patients failed to attend at the end of the seven-day period and two have been discounted from the assessment since antibiotics were administered concurrently.

Clinical assessment of cough is notoriously difficult and in an uncontrolled trial only a clinical impression can be gained. On the other hand, since a cough suppressant is in no sense a curative agent, it may be assessed as being therapeutically successful when there has been marked relief of

Diagnosis	No. of cases	Excellent	Good	Fair	Poor	DNA*	Discontinued	Discounted
Chronic bronchitis	11	3	4	—	2	1	—	1
Tracheo-bronchitis	55	12	15	7	14	4	3	—
Pertussis	4	1	—	1	—	—	1	1
Smoker's cough	6	4	—	1	—	1	—	—
Bronchial neoplasm	1	—	—	—	1	—	—	—
	77	20	19	9	17	6	4	2
		39						

* DNA did not attend.

TABLE I.—Benefits obtained in 77 patients with either acute or chronic cough, treated with 'selvigon'.

symptoms even though these have persisted in a minor form until the natural remission of the disease. In fact, we found that, of the 65 patients completing one week's treatment 48 (74 per cent.) had amelioration of symptoms, and of these 39 (60 per cent.) were classified as 'excellent' or 'good' with the relief of all significant cough by the end of the 3rd or 4th day. Of these patients, 12 had had their cough for more than a month and six for more than a year. All had had a variety of previous treatments.

Three cases were of particular interest.

E.E. had had for many years an unproductive smoker's cough causing stress incontinence. By the second day there was a marked decrease in the severity of the cough and by the 5th day she reported that she was free of cough and that stress incontinence had ceased.

E.C., a severe chronic bronchitic of 34 years' standing, who had previously been treated with antibiotics, antispasmodics, expectorants and sedatives, commented: 'Taking the week as a whole, noticeable relief'. Apart from occasions when antibiotic treatment was given for acute exacerbations, this was the most enthusiastic observation from this patient during four years of treatment.

M.L. had had an acute upper respiratory infection with day and night unproductive cough for a week. At the end of twenty-four hours' treatment she was virtually free from cough. By the end of the third day she was coughing so little that she left off the tablets. Having coughed incessantly through day 4 she resumed the treatment and remained free of cough to the end of the trial period.

One of us (E.W.G.) has received requests from four patients included in

this trial for further supplies as they have found it to be the most efficacious treatment they have received for their long-standing cough.

SUMMARY

(1) Seventy-seven patients suffering from either an acute or chronic cough were treated with a new antitussive, 'selvigon'.

(2) Of 65 patients completing one week's treatment, 39 (60 per cent.) responded well, nine (14 per cent.) showed some improvement, and 17 (26 per cent.) had no benefit. Twelve patients either defaulted, discontinued the drug, or were discounted.

(3) 'Selvigon' is considered to be a satisfactory antitussive and worthy of further clinical trial.

We are indebted to Smith, Kline & French Laboratories Ltd., for generously supplying 'selvigon' for this trial.

GROWING DOWN

A Neglected Aspect of Ageing

By TREVOR HUGHES, L.R.C.P., L.R.C.S.Ed.

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'Which of you, by taking thought, can add one cubit to his stature?'
St. Matthew, xi, 27

Which indeed? But a great deal can be done by taking thought to diminish the loss of stature entailed in the process of ageing, for it is estimated that the average man loses half-an-inch (12 mm.) in height every twenty years after he has attained the maximum; therefore at 80 he will have lost at least 1½ inches (3.7 cm.). This shortening is brought about by fair wear and tear, mostly by the absorption of cartilage especially of the vertebral column, but also of joints of the lower limbs, exaggeration of slight deformities (e.g. kyphosis, lordosis and scoliosis), dropping of the foot arches, and habitual faulty postures found in people who are weighed down with grief, responsibility or hard work. The peculiar structure of the vertebral bodies renders them much more liable to collapse than other bones, for there is no layer of compact bone enclosing them and separating them from their cartilages. In fact, the discs derive their nutrition by a process of diffusion from the blood vessels of the immediately apposed spongy cancellous tissue.

TWO PAINFUL SEQUELÆ

The ageing process in the vertebral bodies has the further disadvantage that it may be painful. Displaced intervertebral disc has assumed pride of place as the main cause of pain in the back with its concomitant disabilities—but not everybody will agree that this lesion occurs with anything like the

frequency with which it is credited. Rather must we seek also for another likely cause and we have it in the narrowing of the vertebral foramina due to the shortening of the vertebral column. It will be remembered that the dura mater sends tubular prolongations (radicles) through the foramina surrounding the two roots of the corresponding spinal nerves as they pass through the intervertebral foramina. Inflammation of the nerve roots between the intervertebral foramina and the cord (a radiculitis) has long been postulated as the cause of sciatica and, when the acute stage has passed, the sequel of radicular adhesion formation has been surmised. Whether or not this is the actual etiology, many cases of sciatic scoliosis are relieved by saline injection into the epidural space.

Another painful disability fairly often met with in the elderly, and caused by the shortening of the vertebral column due to the loss of substance of the tissues, is the over-riding of the lower ribs, on one or other side, on the iliac crest, causing pinching of the intercostal nerves, or, in some cases, disarticulation of the 11th rib.

PROPHYLAXIS

This must be carried out from youth. It consists of raising oneself to one's full height on every possible occasion and this posture should be maintained for as long as possible during the day. Exercises should be practised with this end in view, such as: 'Head backward bend—Upward stretch' of old Army days. While standing erect, the chin should be well tucked in to the chest, arms reaching well down to the sides with fingers extended. The head is extended as far backwards as possible and, after a pause, brought back into its original position. This should be done several times each day. This strengthens the erector spinæ and tends to prevent cervical kyphosis.

Assumption of the correct posture while asleep is also important, especially when it is remembered that most people spend one-third of their lives lying in bed. No doubt a great deal of torticollis can be ascribed to falling asleep carelessly in an uncomfortable position through tiredness, exhaustion or sheer laziness, and it is just possible that some so-called 'slipped discs' of the cervical spine may be brought about by this faulty habit over a number of years.

TREATMENT

Low backache (with sciatica).—At one time a popular method of treating low backache (with sciatica) was by means of a saline injection into the epidural space, but little has been heard of this form of treatment for the last two decades. I have carried out this procedure on a few occasions, with gratifying results, and I now make a plea for its reintroduction: 200 ml. or more of normal saline is injected in the epidural space via the sacral hiatus by means of a lumbar-puncture needle and syringe (Watson-Jones, 1937).

Suggested treatment of over-riding of 12th rib on iliac chest.—I have often wondered whether this troublesome condition might not be relieved by the

relatively simple procedure of subperiosteal filleting of the offending rib or a portion of it.

SUMMARY

(1) An attempt has been made to show that some painful conditions in old age are due to shortening of the spine from one cause or another.

(2) Some measures have been discussed to delay or avert this condition, and to deal with two of the more troublesome complications.

Reference

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A CASE OF HEAVY ASCARIS INFESTATION

By NOOR HUSAIN, M.B., B.S., D.P.H.

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Roundworm infestation is widespread. Manson-Bahr (1952) succinctly sums up its geographical distribution and epidemiology in the following terms: 'World-wide, especially in tropics, in China, India and Pacific Islands. A disease of insanitation'. The interest of the following case lies in the heavy infestation occurring in an infant and the prompt response to piperazine.

CASE RECORD

The patient was a child aged 1½ years, who weighed 26 pounds (12 kg.). His previous history was satisfactory except that he had had occasional bouts of coughing, which would persist for several days. He was quite a robust and chubby infant until early in May this year when he began to show signs of lethargy and listlessness and his old cough returned.

On the morning of May 27 he passed a roundworm in his stools and the cough and restlessness increased. The following night he became restless, coughed incessantly and began to vomit. The following morning his condition worsened. He retained nothing taken by mouth and passed two loose motions. One of the motions contained a roundworm and he vomited up another. In an attempt to control the vomiting and prevent dehydration he was given 10 mg. of chlorpromazine and copious draughts of fluid containing sodium chloride and glucose.

At 17.00 hours he was given 20 ml. of 'antepar' elixir: i.e. 2.5 g. of piperazine citrate. At 23.00 hours he passed a stool which contained two roundworms. During the night he passed another motion containing two roundworms and then at 05.00 hours, on May 29, he passed a motion which consisted almost entirely of roundworms. Subsequent investigation revealed the presence of 97 worms. Thereafter his general condition improved rapidly, the listlessness and general prostration disappeared and there was no further vomiting. He subsequently passed two further stools, one of which contained eight roundworms, and the other two roundworms. At 11.00 hours he was given another two teaspoonfuls of 'antepar' elixir (i.e. 1 g. of piperazine citrate). In all he had passed 114 worms.

In the evening he developed puffiness around the eyes and, to a lesser extent,

in the feet. Examination of the urine was carried out but there was neither albumin nor red blood cells. The puffiness disappeared the following day.

Thereafter the child made a complete and rapid recovery.

SUMMARY

Details are given of a case of heavy Ascaris infestation in a child, aged 1½ years, who responded satisfactorily to the administration of piperazine citrate.

Reference

Manson-Bahr, P. H. (1952): 'Synopsis of Tropical Medicine', 2nd ed., London.

AN EVALUATION OF AN ORAL NASAL DECONGESTANT

By R. H. BRACEY, M.B., Ch.B.,
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Patients continue hopefully to consult their doctors when they have a 'running nose'. Little diagnostic skill is necessary because the condition is self-evident and alleviation or palliation is all that can be offered. As Nature almost invariably achieves a successful conclusion to the illness within a few days of its beginning, doctors can seldom claim cures as a result of their own efforts. Most patients, however, welcome some relief of their symptoms as in a considerable number the amount of suffering and inconvenience is out of proportion to the triviality of the infection. Of the many so-called remedies for the 'running nose' little need be said except that they are usually of limited value and mostly harmless.

SCOPE OF INVESTIGATION

Recently we were asked to assess the value of a nasal decongestant which was to be given by mouth. This preparation, 'eskornade spansules', contains a vasoconstrictor (phenylpropanolamine [50 mg.]), an antihistaminic (diphenylpyraline [5 mg.]), and a synthetic anticholinergic (isopropamide iodide [2.5 mg.]). In 'spansule' capsule form the dosage recommended is one 'spansule' capsule twice a day. The evaluation in the first place was limited to individuals over the age of 10 years.

As the preparation was given by mouth, it was hoped that this method would be more efficacious than local treatment because the presence of nasal and pharyngeal secretions would thus not prevent the drug from reaching the congested mucosæ. In addition, oral treatment would obviate the often too frequent use of nasal drops or inhalers which in some patients have been known to exacerbate the local condition. The rationale of treatment was based on the fact that the antihistaminic would control any allergic

manifestations, the vasoconstrictor would diminish the congestion in the nasal mucous membranes, and the anticholinergic would diminish nasal secretions because of its atropine-like properties.

Patients were treated for an average of 7.4 days. The assessment of the results was made entirely on what the patients told us. All patients had, of course, had previous personal experience over many years of treating a 'running nose'. The individual diagnoses could not always be precisely determined, and have therefore been divided into two main groups: nasal infections, and acute sinusitis.

RESULTS

The results are summarized in table I. Of a total of 48 patients, satisfactory results were obtained in 28. In the remaining 20, 19 derived some benefit from the treatment, and in only one was there no response.

Diagnosis	No. of patients	Results		
		Effective	Fair	No effect
Nasal infections	39	21	17	1
Acute sinusitis	9	7	2	—
Totals	48	28	19	1

TABLE I.—Results obtained with 'eskornade', a nasal decongestant, in 48 patients.

The side-effects encountered were often difficult to distinguish from actual symptoms. There was no doubt, however, that dryness of the mouth was a not unusual concomitant of therapy. Some blurring of vision occurred due to accommodation difficulties but this was mild and evanescent and was complained of by only a few patients. A few patients also complained of drowsiness and one or two of giddiness. Whether these symptoms can be ascribed to the drug or the illness is arguable.

CONCLUSION

If it is considered advisable to relieve a patient's symptoms in a trivial infection, and we ourselves think it is, then a nasal decongestant such as 'eskornade' is of value and should be used. Administration is convenient and the results are encouraging.

SUMMARY

Details are given of a small clinical trial to investigate the value of a new nasal decongestant, 'eskornade', in patients with 'running noses'.

In a series of 48 patients, satisfactory results were obtained in 28, whilst 19 obtained some relief.

GENERAL PRACTITIONER CLINICAL TRIALS

DICHLORALPHENAZONE ('WELLDORM') FOR INSOMNIA

DICHLORALPHENAZONE ('welldorm') is a complex of chloral hydrate and phenazone in tablet form. The main interest of this preparation lies in the treatment of insomnia in adults, when barbiturates are contraindicated. The objects of this trial were first to determine the effectiveness of dichloralphenazone as a hypnotic, and secondly to compare it with other standard remedies. In every general practice there is a considerable number of cases of chronic insomnia, whose medication has to be changed from time to time. As it is often necessary to 'ring the changes' with different hypnotic drugs in these patients, there was little difficulty in changing the medication to

Previous drug	Number of patients using it	Effect		
		+	±	−
Butobarbitone	13	8	5	0
Pentobarbitone	13	12	1	0
Phenobarbitone	10	7	2	1
Cyclobarbitone	6	6	0	0
Amylobarbitone sodium ..	5	2	2	1
'Carbrital'	3	2	0	1
'Tuinal'	2	2	0	0
'Sonalgin'	2	2	0	0
Methylpentynol	4	3	1	0
Meprobamate	2	2	0	0
Promethazine theoclate ..	1	1	0	0
Pethidine	1	1	0	0
Totals	62	48	11	3

TABLE I.—Hypnotics previously prescribed for 57 of the patients included in this study. The total of 62 shown in the table is explained by the fact that several patients had had more than one drug prescribed for them.

dichloralphenazone, the patients then acting as their own controls. Since this type of patient depends on efficient medication, the patient will soon let the doctor know if the new drug does not compare favourably with previous remedies. Hypnotics are also required for short periods, to enable other patients to overcome some particular stressful situation which is causing insomnia, and this type of case was also included in the trial.

SCOPE OF INVESTIGATION

A total of 64 patients was studied, female patients outnumbering male

patients by nearly 5 to 1. The maximum incidence of cases (39 per cent.) was in the 41 to 60 age-group, but an appreciable number of patients in the 21 to 40 age-group also required sedation. The previous hypnotics prescribed for 57 of these patients, together with their effectiveness, are shown in table I. It is apparent that the barbiturates were widely used in these patients, the three most popular being butobarbitone, pentobarbitone and phenobarbitone. It is also apparent that the sedative effect of these remedies was extremely good, since 77 per cent. of patients obtained a completely satisfactory effect from their hypnotic, with a further 18 per cent. obtaining a moderately satisfactory result.

RESULTS

Dichloralphenazone was administered in a dose of 2 to 4 tablets (10 grains [0.6 g.]) and table II shows the results obtained. It is apparent that in this

		No. of patients
Effect of dichloralphenazone	+	33
	±	20
	−	11
Preferred dichloralphenazone ..		14
Preferred previous drug ..		36
No preference		7

TABLE II.—Results obtained with dichloralphenazone in 64 patients.

trial dichloralphenazone did not prove to be as satisfactory a sedative as the previous drugs, as only 52 per cent. of the patients obtained completely satisfactory sedation, whilst 31 per cent. obtained moderately satisfactory sedation and 17 per cent. obtained no sedation at all. This fact is further borne out by the patients' preference for their previous drugs as compared with dichloralphenazone, this being in the ratio of $2\frac{1}{2}$: 1.

The barbiturate group of drugs gives a range of action, from the short-acting butobarbitone, through the medium-acting cyclobarbitone to the long-acting phenobarbitone, to cover all degrees of sedation from two to eight hours. A full night's sleep (six to eight hours) was enjoyed by more patients on their previous medication, than on dichloralphenazone, since 73 per cent. of patients slept all night with their previous medication as compared with 49 per cent. with dichloralphenazone. It was also noted that the rather large size and the number of tablets necessary to produce sedation with dichloralphenazone, as compared with other preparations, were disadvantages and that patients generally preferred something small, involving

the taking of only one or two tablets at a time. Smaller doses of dichloralphenazone were apparently not effective.

SIDE-EFFECTS

On the other hand, with regard to side-effects, dichloralphenazone was better tolerated than the previous hypnotics. Thus, 78 per cent. of patients taking dichloralphenazone experienced no side-effects at all, compared with 64 per cent. of the total taking the previous drugs and only 60 per cent. of those taking barbiturates. 'Hangover' was the commonest side-effect, with the barbiturates, occurring in 37 per cent. of patients. Dichloralphenazone was not free from producing this side-effect, but the incidence was reduced to almost half as compared with the barbiturates. A few patients taking dichloralphenazone experienced epigastric discomfort or nausea (6 per cent.), whereas this side-effect was not encountered with any of the other drugs. Sensitization rashes with barbiturates occurred in two cases (3 per cent.) which would be an absolute contraindication to the continued use of these drugs in those patients; this side-effect was not encountered, and indeed would not be expected, with dichloralphenazone.

CONCLUSION

It was concluded that dichloralphenazone, in a dose of 2 to 4 tablets, is a fairly satisfactory sedative, but probably not as good as the barbiturates. Against this is placed the fact that side-effects occurred more often with the barbiturates than with dichloralphenazone. It was felt that despite the increased incidence of 'hangover' when using the barbiturates, these still remain the treatment of choice for insomnia in general practice. Dichloralphenazone, however, is a useful alternative for those patients who are inconvenienced by the side-effects of barbiturates. Sensitization rashes to barbiturates are an absolute contraindication to the continued use of these drugs, and an absolute indication for a non-barbiturate drug such as dichloralphenazone.

The following practitioners took part in this investigation:—

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SECTION OF GENERAL PRACTICE OF
THE ROYAL SOCIETY OF MEDICINE

DISCUSSION ON THE RIGHT PATIENT IN THE RIGHT BED

December 21, 1960

Dr. C. Allan Birch (*Chase Farm Hospital, Enfield*).—The right bed for any patient is that bed in which he can get whatever medical and nursing care he needs. Finding any bed, rather than the right bed, is sometimes all that is done.

GROUP ADMISSIONS OFFICE

To overcome difficulties of admission the Enfield Group Hospital Management Committee, in November 1957, set up a Group Admissions Office, staffed by one administrative officer and one clerk. It deals with about 1000 admissions and 200 day cases each month into about 1000 beds of five hospitals. A bed board showing the bed state in each hospital is brought up to date each morning, and then kept correct throughout the day. The office also controls all waiting lists, and is able to provide useful statistical information very easily. This office has brought about many improvements, such as quicker replies to requests for admission, better bed occupancy, quicker turnover and a reduction in waiting lists.

Hospitals should aim to equip their beds with hotel type service and learn to observe the biblical injunction: 'A soft answer turneth away wrath'. Any bed may be the wrong bed for the patient who should be up on his feet, and the risks of unnecessary bed rest are well known. Cottage hospital beds cannot usually provide emergency cover, and might be replaced by general practitioner units in general hospitals. Casualty beds for patients needing observation for short periods can save admissions to general wards.

Separation of medical and surgical beds can be a disadvantage in some conditions, such as acute gastro-intestinal hæmorrhage. Long-term medical treatment should not be forgotten when the patient is in a surgical ward. Some patients appreciate corner beds and many would like to see separate rooms for smokers and those needing segregation. If 'rooming in' is adopted for babies the cot should be at the mother's bedside where she can see her baby, rather than elsewhere in the room. Bars in babies' cots must not be more than $3\frac{1}{16}$ inches (7.8 cm.) apart.

Dr. G. F. Abercrombie (*Hampstead, N.W.*3).—There is no place like home, and modern drugs are of immense value in helping general practitioners to treat patients there. Difficulty in obtaining nursing and domestic help, however, makes this more difficult. Surgeons no longer operate in the home, owing to lack of time and the necessary highly specialized facilities which are only available in hospital.

Patients with coronary occlusion are best kept at home, owing to the extra hazards involved in transferral to hospital. On the other hand, miscarriages are best sent to hospital, where observation can be continuous and action taken if necessary. In the field of obstetrics, for various reasons, 70 per cent. of confinements should take place in an institution, and that percentage will most certainly increase, but there is no reason why many patients should not return home within forty-eight hours, when the obstetric hazards are at a minimum. The choice of the right bed is dependent upon a number of extraneous factors and a previous happy experience in a particular hospital is a most compelling reason for a return to that hospital.

THE EMERGENCY BED SERVICE

Urgent admission to hospital in the Metropolitan area of London may be achieved by several methods. For an accident occurring in the home, admission may be expedited by dialling 999, and urgent cases may be transferred to hospital by direct request. Alternatively, a domiciliary consultation may be arranged without undue delay. This is the best method when the general practitioner is in genuine doubt as to whether or not his patient should be sent into hospital. Finally, about 65,000 cases a year, in London, are admitted through the Emergency Bed Service, but neither patient nor doctor has much choice of hospital when this method is used. The work of the E.B.S. is subject to very considerable seasonal variations. For acute surgical cases, in the last three years there was a steady average of about 800 a month, with more women than men being admitted. By contrast, the seasonal variation in the respiratory group is enormous, and males always outnumber females. The influenza epidemic in 1959 strained the resources of the service and of the hospitals to the uttermost, so that it was no longer a question of the right patient in the right bed, but almost of any patient in any bed. Applications for unbooked maternity cases are nearly three times as numerous as they were three years ago. Some other curious facts emerge. The E.B.S. is invariably asked to arrange admission for more male infants than females, and of the young adults, women are more often admitted than men. Between 45 and 64 years of age, men outnumber women, and finally between 65 and 79 years of age, male admissions fall below female ones.

There are times when there is great difficulty in getting the right patient into the right bed, and we require a better feeling and greater sympathy between hospitals and general practitioners.

Mr. V. J. Downie (*Barnet General Hospital*).—One of the treasured relics of a certain Midlands hospital is a one-time regulation forbidding more than two patients to occupy the same bed at the same time. Of recent years, however, we have attained the habit of giving each patient a bed of his own! The hospital population is segregated according to sex and divided by age into children, the aged, and the rest. Shortage of geriatric beds often requires mixing of the aged and the remainder. By recent decree, a child is deemed to have criminal responsibility after the age of twelve, and then to be a fit associate for his elders and betters in the adult wards. There is no separate accommodation for adolescents; and pain, death, incoherence, obscenity and the physical ravages of disease are grim companions for a teenage child.

THE 'SECOND BED'

Our anæsthetist colleagues were the first to recognize that one bed per patient is not enough, and they demand that every operating theatre shall have an adjacent recovery ward. Here, the patient is unaware of his 'second bed', but afterwards he is acutely conscious of his environment. He is not likely, however, to share our detached appreciation of the therapeutic paraphernalia which encumbers some of his neighbours, and is understandably curious about his fellow-companions who may have had similar operations to his own. The occurrence of complications in fellow-patients may cause a period of intense anxiety before an operation.

ACUTE AND ROUTINE WARDS

At the Barnet General Hospital the general surgical block is divided into acute wards and routine wards. The acute wards receive patients only from the operating theatre, whilst patients for elective operation, or for observation and investigation, are admitted to the routine wards. Emergency admissions for immediate operation go direct to the theatre from the casualty department. The dying are generally nursed in the side-rooms. By these methods, no patient encounters the distress of others until such a time as it is outweighed by his own travail. There are some disadvantages in this arrangement, and a few patients complain of transfers from ward to ward. Surgical teams lose their proprietary rights in any particular ward, and the nursing staff must familiarize themselves with differing techniques. Although the recovery ward is the province of the anæsthetist, patients suffering from barbiturate poisoning, status epilepticus and status asthmaticus may also be treated here, where the physicians may require the special experience of anæsthetists in the field of respiratory physiology.

A GIFTED COUNTRY PRACTITIONER

FRANCIS ADAMS OF BANCHORY (1796-1861)

By H. P. TAIT, M.D., F.R.C.P.Ed., D.P.H.

Honorary Secretary, The Scottish Society of the History of Medicine

'My ambition always was to combine extensive knowledge of my profession with extensive erudition'. Such was the credo of one of the most famous country doctors of the 19th century, Dr. Francis Adams of Banchory, Kincardineshire, the centenary of whose death falls on February 26, 1961. The late Professor Singer (1942) wrote a delightful sketch of this Gideon Gray, and Verney (1957) paid his tribute also, but we would do well to remember Adams again at this time and draw inspiration from his life.

EARLY YEARS

Born of humble parentage on March 13, 1796, at Lumphanan on Deeside, Adams was educated at the local parish school and Aberdeen Grammar School. Entering King's College, Aberdeen, with a bursary, he graduated M.A. there in 1813. Seemingly bent on the study of medicine he probably spent the next two years in Edinburgh attending the medical school and serving as an apprentice to a surgeon-practitioner there. In the autumn of 1815, he went to London where, on December 1, he qualified M.R.C.S.

MEDICAL PRACTICE

Returning to Kincardineshire, he settled down to general practice in Banchory (fig. 1) where he purchased the Old Manse. This he enlarged from time to time, but the house no longer remains. Here, amid the mountains and the streams, he practised throughout his life. The practice, although not lucrative, was extensive, especially in the obstetric line. Dr. John Brown, who knew Adams well, wrote of him (1897):—

> 'He was an attentive, resolute, wise practitioner, just such a man as we would like to fall into the hands of, were we needing his help. He was always up to the newest knowledge of the time, but never a slave to any system, or addicted to swear by any master. The whole cast of his mind was thoroughly free and self-sustained'.

Adams made many contributions to medical literature, including articles on adder bites, dislocation of the knee-joint, poisoning by arsenic, the construction of the placenta, fœtal auscultation, the treatment of burns, of malignant ulcers of the face, and of club-foot, fatal rupture of aortic aneurysm in a pregnant woman with necropsy report, and several articles on uterine hæmorrhage. He was a member of the Medico-Chirurgical Society of Aberdeen, making the 17 miles to and from the city to attend meetings. He at first declined to accept the Presidency of the Society but the members insisted and reluctantly he took the chair and regularly pre-

sided over its proceedings, resigning in 1860 (Riddell, 1922). He was also a corresponding member of the Medico-Chirurgical Society of Edinburgh.

Truly it can be said that he spent his days in the arduous and useful profession of a country practitioner, out on horseback in all weathers and at all hours, having the lives, the births, and the deaths of a wild outlying region in his hands.

CLASSICAL SCHOLARSHIP

Adams described Banchory 'with its glassy river and magnificent hills rising in front and behind like another Tempe, with its Peneus flowing between

FIG. 1.—Banchory in 1855
(reproduced from 'The Scenery of the Dee' by kind permission of the Librarian, Aberdeen Public Library)

Ossa and Olympus', and this gives us a clue to another side of this remarkable and accomplished man. How his interest in the classics, especially Greek, was aroused, is best told in his own words:—

'As far as I can think, my classical bent was owing to a friendship which I formed, when about fifteen years old, with a young man a few years older than myself, who had enjoyed the benefits of an excellent education at Montrose, which gave him a superiority over myself that roused me to emulation.

In my early years I had been shamefully mistaught. I began by devoting seventeen hours a day to the study of Virgil and Horace, and it will be readily believed that such intense application soon made up for any early deficiencies.

I read each of these six or seven times in succession. Having mastered the difficulties of Latin literature, I naturally turned my attention to Greek as being the prototype of the other.

It was the late Dr. Kerr of Aberdeen who drew my attention to the Greek literature of medicine, and at his death [about 1826 or 1827] I purchased a pretty fair collection of the Greek medical authors which he had made. However, I have also read almost every Greek work which has come down to us from antiquity, with the exception of the ecclesiastical writers; all the poets, historians, philosophers, orators, writers of science, novelists, and so forth'.

Apart from works on pure scholarship, Adams' most important labours were on the subject of Greek and Roman medicine. His first study was 'On

the Nervous System of Galen and other Ancient Authors' (1829). In 1834, he published the first volume of a translation of and commentary on Paulus Ægineta, but this was interrupted by the failure of his publisher. The matter, however, was taken up later by the Sydenham Society and Adams accomplished for it the complete translation of Paulus in three volumes (1844-47). This work proved exhausting and tiresome, for in an autobiographical fragment he wrote:—

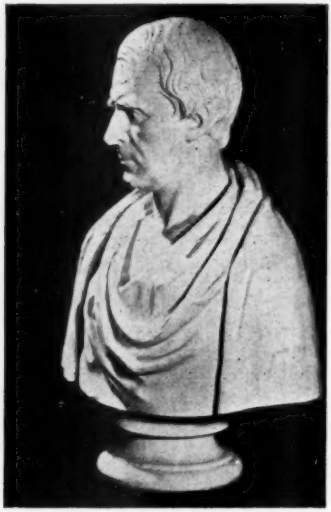

FIG. 2.—Francis Adams

'I never, at any period of my life underwent so much drudgery, and during three months I sat up late and rose early, and snatched every minute I could from the duties of my profession. . . . I managed, however, to work at my translation ten hours a day'.

The effort was well worth while for Adams' commentary shows wide and accurate learning and gives the most complete account of Greek and Roman medicine in the English language. The work, in fact, established him among the scholars of the period with many of whom he kept up a close correspondence and was on terms of intimate friendship.

He translated the so-called 'Genuine Works' of Hippocrates in two volumes with notes for the Sydenham Society in 1849, and of this he wrote:

'I finished the translation of Hippocrates in about four months. The certainty of attaining a fair remuneration for the trouble it cost me, and that it would not be a light hid under a bushel, made this by far the most delightful task I ever engaged in. The reception of it was everything I could desire. It cost me some professional sacrifices, but this was amply made up by the delight and mental improvement it conferred on me'.

Although this work has been superseded by other more modern translations, it is interesting to note that as recently as 1950 a well-known American publishing firm republished Adams' translation. In 1856 he followed with

his edition and translation of Aretæus the Cappadocian, also for the Sydenham Society.

Adams' fine scholarship led to his being offered the chair of Greek at Aberdeen, but this he declined on the plea of his preference for the practice of medicine. Honours came freely to this great man. The degree of Doctor of Laws was conferred on him by Glasgow University (1846) and the M.D. *honoris causa* by Aberdeen University (1856), the latter in recognition of his work on Aretæus.

THE MAN

Adams was tall and well-built with handsome features. A devoted family man, he lost his wife early in life and was left with the care and education of six children to add to his other preoccupations. This he accomplished most successfully and one of his daughters recollected him thus:—

'It was in the home circle we can speak most of our dear father, for there he was everything that a loving parent could be. Although so busy in his profession and at his literary work, he always found time to superintend my brothers with their Latin and Greek, and encourage us all to have tastes for improving studies. When we look back it is marvellous to think how much time he spent amongst us, getting us to commit to memory pieces he considered the finest in the English language, both in prose and verse. He encouraged my brothers to have a taste for natural history, and explained any wild plant he found in his rounds' (Rodger, 1893).

His interest in natural history was shown in 1859 when, on the occasion of the meeting of the British Association in Aberdeen, Adams in collaboration with his son, Dr. Leith Adams, read a paper on ornithology.

A delightful anecdote of the old man is told by Brown (1897):—

'Some years ago, when travelling through this noble and beautiful region, we went across from the inn at Banchory to introduce ourselves to the translator of the divine old man of Cos. We found him at breakfast, ready for his ride up the Feugh, and amusing himself with pencilling down a translation of an ode of Horace into Greek verse'.

Adams died from pneumonia following an exhausting ride to see a patient on a wild night. After his death, a granite obelisk was erected to his memory at Banchory, and a bust, in marble, by William Brodie, was presented to Aberdeen University. This bust disappeared for several years, but in 1951, on the occasion of a visit of the Scottish Society of the History of Medicine to King's College, Professor John Craig, when speaking of Adams, dramatically drew aside a curtain to reveal the lost bust (fig. 2) which Craig, after a long search, had finally discovered in an old storeroom of the University joiner!

EPILOGUE

Surely Adams richly deserved Brown's appellation of *doctissimus medicorum Britannorum*.

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CURRENT THERAPEUTICS

CLVIII.—POTASSIUM PERCHLORATE IN THYROTOXICOSIS

By JAMES CROOKS, M.D., M.R.C.P., M.R.C.P.Ed., F.R.F.P.S.
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THE antithyroid action of potassium perchlorate was originally demonstrated by Wyngaarden, Wright and Ways in 1952. It was first shown to be an effective drug in the treatment of thyrotoxicosis by Godley and Stanbury (1954) and this finding has been confirmed by many workers in different countries.

GENERAL CONSIDERATIONS

Its place in the treatment of thyrotoxicosis must be viewed against the background of the therapeutic value of the antithyroid drugs in general. The first two of these drugs to be used clinically were thiourea and thiouracil but the initial enthusiam with which they were received was soon diminished by the occurrence of serious side-effects. When derivatives such as methylthiouracil and propylthiouracil became available toxic effects were reduced to a level at which the risk of leaving the patient untreated exceeded the risk of undesirable effects produced by the drugs. The thiourea derivatives were joined by the imidazole group, including methimazole and carbimazole, which also caused few toxic reactions.

Although the problem of toxicity had become less acute, it was found that permanent remission of thyrotoxicosis produced by antithyroid drugs occurred in less than 50 per cent. of cases even when therapy was continued for twelve to eighteen months. For this reason the number of patients receiving surgical or radioactive iodine treatment has increased in recent years (Macgregor, 1960). Nevertheless, the majority of patients with thyrotoxicosis receive antithyroid drugs at some time, and the speed and certainty of their action may make them necessary even when it has been decided to operate or give radioactive iodine subsequently. Furthermore, it is probable that they should be used in children, in the young patient with a short history and a small goitre, and for thyrotoxicosis complicating pregnancy.

Antithyroid drugs therefore still have an important part to play in the treatment of thyrotoxicosis and it is clearly of importance to know which is the most effective and safest member of the group. All antithyroid drugs in current use are equally effective provided large enough doses are used and the choice of drug must therefore depend primarily upon the incidence of toxic effects. The balance of evidence suggests that the organic antithyroid substances belong to that group of drugs in which the frequency of toxic reactions is related to the dose level (Lehr, 1948). This also occurs with the inorganic compound, potassium perchlorate, and when com-

parisons are made between the frequency of toxic effects produced by different drugs they must be compared in doses producing similar therapeutic effects. When this has been done potassium perchlorate has been shown to have a significantly lower frequency of side-effects than methylthiouracil or carbimazole (Crooks and Wayne, 1960; Morgans and Trotter, 1960). For this reason and because it is cheaper than the organic drugs, the wider use of potassium perchlorate has been advocated in cases in which long-term treatment with an antithyroid drug is indicated.

MODE OF ACTION

Perchlorate belongs to a group of anions which owe their goitrogenic action to interference with the iodide-trapping mechanism of the thyroid. The exact mechanism by which the drug acts is unknown but it can be overcome by the administration of iodide (Wyngaarden *et al.*, 1952) although the amount of iodide in a normal diet is insufficient to do this (Crooks and Wayne, 1960). It is not necessary therefore to restrict dietary iodide when using perchlorate, and it is sufficient to avoid medicines which contain iodide. It is of interest that one dose of 200 mg. of potassium perchlorate will produce a complete block of radioactive iodine uptake for twenty-four hours in normal subjects but only for four hours in hyperthyroid patients (Dickson *et al.*, 1959). Some suppression of radioactive iodine uptake persists for many days after stopping treatment with perchlorate (Halnan and Pochin, 1958; Goolden and Mallard, 1958).

DOSAGE

In the initial clinical trials of potassium perchlorate the doses used were from 400 to 600 mg. daily (Godley and Stanbury, 1954; Morgans and Trotter, 1954; Buttaro and Brunori, 1955) and this led to the conclusion that the drug controlled symptoms more slowly than methylthiouracil or carbimazole. Further experience, however, showed that the rate of control was a function of the dose (Kleinsorg and Krüskemper, 1957; Crooks and Wayne, 1960). Furthermore, Dickson and his colleagues (1959) and Crooks and Wayne (1960), using different criteria of 'cure', showed that with 1000 mg. daily patients became euthyroid in an average time of nine weeks, comparable with the results after treatment with either methylthiouracil or carbimazole. The dose of potassium perchlorate should therefore be 1000 mg. daily in four or five divided doses. After the patient has become euthyroid a maintenance dose of 200 to 500 mg. daily is usually satisfactory.

A point of some importance, which applies to all the antithyroid drugs, is that the absence of a clinical response after six weeks' treatment does not necessarily mean that control will not be achieved ultimately. Such cases probably have a larger amount of stored hormone to be utilized than is usual in thyrotoxicosis and this factor is an important one in the wide variation in the rate of control of symptoms irrespective of which drug is used.

PREOPERATIVE USE

There is general agreement that antithyroid drugs should be used to prepare thyrotoxic patients for surgery. This is usually done by controlling the disease with one of the organic drugs and by giving iodine for ten to fourteen days before the operation. This procedure probably renders the gland less vascular and diminishes the risk of postoperative thyroid crisis. Potassium perchlorate has also been used successfully to prepare patients for operation when the gland was small and nodular (Crooks and Wayne, 1960). In these patients the drug can be stopped at the time of operation because there is some persistence of the blocking effect on thyroid hormone synthesis. Iodine should not be used—as it is in the case of the organic antithyroid drugs—because of the danger of escape from control (Godley and Stanbury, 1954). It must be emphasized that these remarks only apply to the relatively less common small nodular glands since other workers who have used perchlorate preoperatively in unselected cases (Dickson *et al.*, 1959) comment on the increased vascularity of the glands although this feature is notoriously difficult to assess. In the majority of patients suitable for operation therefore there does not appear to be a strong case for replacing carbimazole by perchlorate, and the latter should be reserved for cases in which sensitivity to carbimazole has occurred.

PREGNANCY COMPLICATED BY THYROTOXICOSIS

The most appropriate form of therapy for women who develop thyrotoxicosis during pregnancy is the administration of an antithyroid drug. Goitre and hypothyroidism have been reported in the infants of mothers receiving such treatment (Eaton, 1945; Ball and Morrison, 1948), but it is a rare event and, when it does occur, unduly high doses have usually been given (Macgregor and Goodwin, 1953). Potassium perchlorate controls thyrotoxicosis in pregnancy as effectively as in the non-pregnant patient (Crooks and Wayne, 1960). As in the case of the other antithyroid drugs, the patient should not breast-feed her infant because of secretion of the drug into the milk. The controlling dose of potassium perchlorate is the same as in the non-pregnant patient and the maintenance dose should be adjusted to keep the patient slightly hypermetabolic.

JUVENILE THYROTOXICOSIS

Thyrotoxicosis in childhood is rare, but when it does occur it presents a special problem. The value of antithyroid drug treatment is disputed but should operation be necessary it is generally desirable to postpone it, if possible, until after puberty. Since it may be necessary to continue treatment with an antithyroid drug for many years the low toxicity and cheapness of perchlorate give it a particular advantage over its rivals, and Smellie (1957) has reported favourably on its use in children.

SIDE-EFFECTS

When the recommended doses are used *nausea* may be troublesome in a few cases but the coincident administration of an antacid usually allows

treatment to continue. The most common side-effect produced by perchlorate is a ***skin rash*** which is usually maculo-papular in nature and confined to the extremities. In about half the cases the rash subsides within one week although treatment is continued. With daily doses of 1000 mg. and under, the incidence of rashes is very low, occurring in only 1 in 200 cases (Crooks and Wayne, 1960) or 2 in 108 cases (Morgans and Trotter, 1954). With larger doses, however, there is a marked increase in the number of rashes, and doses exceeding 1000 mg. daily should not be used. Both drug fever and lymphadenopathy can occur.

The occurrence of agranulocytosis has shown that hypersensitivity affecting the bone marrow can occur. Several cases have been reported with doses ranging from 1000 mg. to 1,600 mg. daily (Southwell and Randall, 1960; Crooks and Wayne, 1960; Morgans and Trotter, 1960). A case of total marrow aplasia following doses of 1000 mg. daily has been known to occur (Greenbaum, 1960). The number of reported cases is too small to afford valid comparison with methylthiouracil and carbimazole in this particular respect, but the complication occurs sufficiently often with these two drugs to suggest that, from this point of view, they have no advantage over perchlorate.

CONCLUSION

Potassium perchlorate is preferable to other drugs used in the treatment of thyrotoxicosis only because of its lower toxicity and its very low cost. On the other hand, the organic antithyroid drugs in current use are effective and of relatively low toxicity, and many physicians may prefer to continue to use drugs of which they have experience. Nevertheless, the evidence now available suggests that potassium perchlorate has a place in the long-term treatment of thyrotoxicosis in patients for whom antithyroid drugs are indicated, and it may well gain general acceptance as the drug of choice in the medical treatment of this condition.

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CALLING THE LABORATORY

XIV.—EXAMINATION OF PLEURAL FLUID

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THIS article is confined to the laboratory findings in those effusions resulting from intrathoracic diseases. These are acute and chronic pyogenic infections, tuberculosis, primary and metastatic neoplasms of the lungs and pleura, together with the transudates resulting from cardiac or renal failure. Nevertheless, it should be remembered that pleural effusions on one or both sides may be associated with generalized peritonitis, subphrenic or liver abscess, and rarely with benign ovarian tumours (Meigs' syndrome). They also occur during the course of the collagen diseases, disseminated lupus erythematosus, polyarteritis nodosa and rheumatoid arthritis.

MATERIAL REQUIRED

A sample of all pleural effusions should be aspirated for bacteriological, cytological and simple chemical examination, although the findings may be no more than confirmatory of the clinical diagnosis. If sputum is present it should be subjected to bacteriological and cytological examination at the same time. The specimen should be withdrawn under strict aseptic precautions. With one exception—the bacteriological demonstration of *M. tuberculosis*—a sample of 30 ml. is sufficient. This should be delivered in a sterilized Universal container to which 1 ml. of sterile 20 per cent. sodium citrate has been added to prevent clotting. At the first aspiration, or in cases of doubt, a few millilitres should be placed in a tube and observed for clot formation.

MACROSCOPIC EXAMINATION

The naked-eye appearance of the fluid may give useful information, and suggest which type of investigation should be stressed, and perhaps supported by further specialized techniques. The golden shimmering appearance of a cholesterol effusion due to long-standing tuberculous disease is characteristic. An opaque milky-looking fluid may be due to alteration in the protein content of a chronic tuberculous effusion or a true chylous effusion containing fat associated with traumatic or neoplastic involvement of the thoracic duct. If the effusion does contain chyle this may be confirmed at a subsequent aspiration by the staining of the fat globules which occurs if the patient be given the dye, Sudan III (100 mg. in 10 g. of butter), by mouth some hours previously. Occasionally the contents of a hydatid cyst will be aspirated by mistake and the clear watery nature of the sample, confirmed by microscopic demonstration of hooklets, will immediately con-

firm the diagnosis. Bloodstaining of the specimen is not pathognomonic of malignant infiltration of the pleura but should always be regarded with suspicion.

BACTERIOLOGICAL EXAMINATION

Every sample of all effusions must be cultured both aerobically and anaerobically. Films of the centrifuged deposit are examined for pyogenic organisms and acid-fast bacilli. Positive findings should be reported at once, the result of aerobic culture after twenty-four hours, and of anaerobic cultivation after forty-eight hours. The antibiotic sensitivities of isolated organisms are determined as quickly as possible. It is unlikely that *M. tuberculosis* will be isolated by Lowenstein-Jensen culture or guinea-pig inoculation unless a larger sample than the usual 30 ml. is concentrated by centrifuging. It has been shown that if several hundred millilitres are prevented from coagulation by sodium citrate and the deposit inoculated on twelve bottles of medium, positive results may be expected from almost all such samples. Such complete aspiration is now rarely undertaken during the management of the case.

CYTOLOGICAL EXAMINATION

The predominating type of cell found in an effusion may be helpful. The cellular, centrifuged deposit in exudates associated with bacterial pneumonias is polymorphonuclear. The findings are similar in the effusions accompanying a pulmonary infarct but many of the cells may be of the eosinophilic variety. In the earliest stage of a tuberculous effusion there may be many polymorphonucleats with a high proportion of eosinophils but in the later stages the cell pattern is persistently lymphocytic with a striking paucity of mesothelial cells. According to some authorities this absence of mesothelial cells in tuberculous effusions may be of value in differentiating that condition of fluid due to malignant disease.

The findings in effusions associated with carcinoma of the bronchus or pleural deposits from more distant primary sites are inconstant. Polymorphs, lymphocytes and mesothelial cells will all be present in varying proportions. In cases with a bronchial primary this is not surprising as the effusion itself may be due to many factors alone or in combination. Thus, it may accompany the infective changes distal to the bronchial obstruction; areas of infarction are found in 10 per cent. of lungs affected by carcinoma of the bronchus. Hilar or mediastinal lymph-node metastasis may cause obstruction to lymphatic pathways which may themselves be blocked by permeating columns of tumour cells. It is only with extreme rarity that tumour cells can be unequivocally demonstrated in such an effusion. It would seem that they are more often found in fluids resulting from pleural involvement from a carcinoma of the breast rather than of any other site. The cytologist's difficulty arises from the pleural mesothelial cells which are shed both singly and in clumps. These show mitotic figures and assume

the most bizarre shapes and nuclear-staining reactions and may be mistaken for actual tumour cells.

CHEMICAL ANALYSIS

Simple chemical analysis will differentiate those clear effusions due to the transudation of fluid which occur in congestive cardiac failure and chronic nephritis. They may be bilateral and associated with ascites or generalized œdema. Such transudates, in contradistinction to exudates, usually do not coagulate, their specific gravity is lower and does not exceed 1,015 to 1,018, and the total protein content is smaller and below the range of 2.5 to 3 g. per 100 ml. An analysis of this type is sufficient to confirm the clinical impression, but if there is superadded pulmonary infarction or infection it will be modified by an increase in the protein content and specific gravity. At the same time the scanty lymphocytes and mesothelial cells of the simple transudate will be outnumbered by the polymorphonuclear response to the complication. More advanced chemical techniques such as paper electrophoresis and paper partition chromatography do not assist in the differentiation of the causes of pleural effusion.

PLEURAL BIOPSY

The development of the Harefield needle has enabled a biopsy specimen of the parietal pleura to be obtained at the same time as an aspiration of the fluid is performed. The small successful biopsy specimen contains intercostal muscle, extrapleural fat and pleura with fibrinous or organizing exudate. Serial sections are prepared from it. In one series histological evidence of tuberculosis was found in 80 per cent. of the patients suffering from primary tuberculous effusions. Giant-cell systems are present in the organizing pleural exudate and occasionally in the small extrapleural lymph follicles. Malignant infiltration can be confirmed in about 60 per cent. of the cases. In such specimens islands of tumour cells are present in a thickened fibrous pleura or they may be seen permeating the lymphatics. It should be remembered that it is the parietal pleura which is being examined and during the early course of the disease the needle may not strike an involved area. In those patients with an effusion due to pulmonary infections, the biopsy shows organizing fibrinous exudate infiltrated by inflammatory cells. The procedure carries no immediate risk but the later development of tumour implants in the needle track is known to occur.

PRINCIPLES OF REHABILITATION

II.—AIDS TO MOBILITY

By W. RUSSELL GRANT, M.R.C.S., L.R.C.P., D.Phys.,Med.

Director, Department of Physical Medicine, Royal Hampshire County Hospital, Winchester, and Winchester Hospital Group Agricultural Rehabilitation Unit

Man is essentially gregarious and one of the dangers of accidents or illnesses affecting the lower extremities is the liability of the individual to be separated from the herd, due to loss of locomotion, which may well allow him to become bed-bound, room-bound or house-bound.

SELF-PROPELLING CHAIRS

Many and varied, practical and otherwise, are the gadgets which have been contrived to help the disabilities of the upper extremities, but in the case of the lower extremities one gadget alone, in the form of the self-propelling wheel-chair, goes far to restore the function of mobility. The self-propelling wheel-chair is such a common everyday sight that nearly everyone takes it for granted, and seldom is there enough critical thought given to the selection and prescription of it. This is a great pity and often results in a patient receiving a chair which is unsuitable. The following general points are made in selecting a chair:—

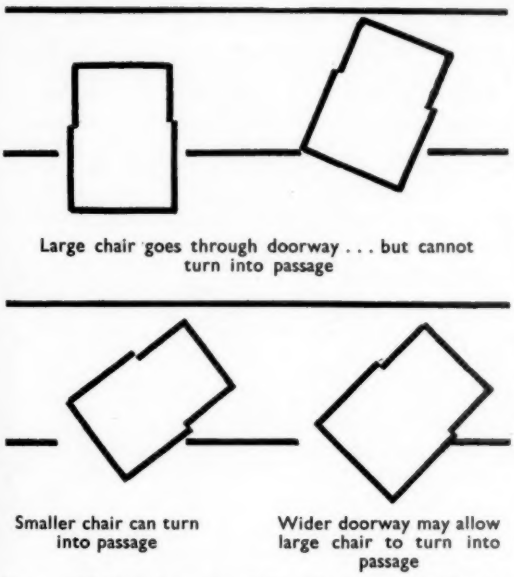

Large chair goes through doorway . . . but cannot turn into passage
Smaller chair can turn into passage
Wider doorway may allow large chair to turn into passage

Fig. 1.—Width and manœuvrability of a self-propelled chair.

(i) Size.
(ii) Manœuvrability.
(iii) Accessibility.

Size must be adequate for the patient to sit comfortably all day. (Which of us is not familiar with discomfort which can be produced only too quickly by the usual form of stacking chair?) The seat width must therefore be adequate, but not lavishly so.

Manœuvrability depends on the width and length of the chair. All too often one sees patients in their homes with chairs which will go through the doorways but which are too great in their diagonal measurement to turn into the passage. Generally speaking, this diagonal measurement is approximately the radius of the arc described by the outside of the foot-rest when the chair is making a turn (fig. 1). Naturally the greater the width of the doorway relative to the chair, the less the radius of this arc becomes, due to the fact that the chair is able to start turning in an extra-wide doorway before it is completely through the doorway.

Accessibility.—Some chair-users can just stand and for them the main requirement will be divided and folding foot-rests which will allow them to keep as near to the chair as possible when sitting down or getting out of the chair (fig. 2). This is particularly important from the point of view of leaving the chair : a simple trial will prove that it is nearly impossible to stand up from a chair if the feet are kept some eight to ten inches in front of the seat by means of fixed foot-rests.

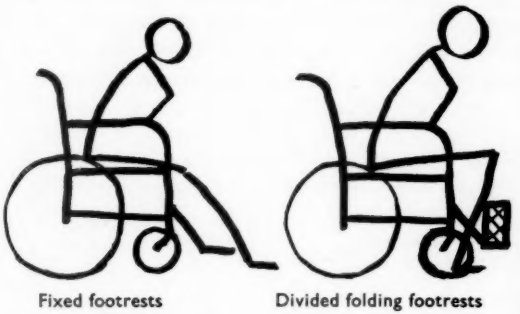


FIG. 2.—The importance of the foot-rest.

Very often the chair-user cannot stand and will enter the chair by sliding on his seat sideways off the bed or toilet. Such people should have chairs with removable arm-rests and with large propelling wheels at the rear (fig. 3). Severely handicapped people may need a hoist to enter and leave the chair, and it is intended to deal with suitable hoists and slings in the next article in this series.

FIG. 3. — Removable arm-rests and large wheel at the rear allow the user to slide sideways when entering or leaving the chair.

Certain W.C. pedestals are so sited that a chair with divided foot-rests can be run right up to the pedestal, and some people find it easier to slide forwards from their chairs on to the toilet seat and use the toilet seat back-to-front. This is often possible in the case of the low-level type of toilet suites and may be the only way of approaching the toilet if the lavatory is very narrow. The chair must also be small enough to occupy only its fair share of space when the owner is sitting round the table or in

front of the fire. Removable arm-rests are usually essential to allow the patient to get near enough to the table to eat.

In addition to these general points, it should be remembered that:—

(a) A chair must fold so that it can be taken by car, train or motor-propelled tricycle.

(b) It must have reliable brakes; the best are those of the cam type which are either off or on.

(c) It must have foam rubber tyres—pneumatic tyres are excellent in theory but require blowing up at far too frequent intervals.

To sum up, when providing a person with a chair, it is wise to see that the chair has the following features:—

(i) Width and length of chair to be of a reasonable minimal dimension.
(ii) Foot-rests to be divided and folding.
(iii) Removable arm-rests.
(iv) Cam type brakes.
(v) Tyres that do not require blowing up.

Chairs fulfilling these requirements are readily obtainable free of charge through a hospital consultant, and the Model 8 transit chair can be made to incorporate the various fixtures mentioned.

FIG. 4.—Rubber-tipped washing tongs used by chair-ridden lady to pick up a milk bottle.

Almost everybody who has to use a chair has at some time or other fallen out of it. In almost every case this fall has been occasioned by trying to reach over and pick up some object from the floor. I therefore strongly recommend that all chair-users are given, or provide themselves with, a pair of rubber-tipped washing tongs which can be obtained from most ironmongers for less than 10*s*. (fig. 4).

INDOOR ELECTRIC CHAIRS

Whilst the self-propelling chair is adequate for a person with normal upper extremities, there is a small number of people who are too weak or too

deformed in the upper extremities to propel this about, but some have sufficient movement and control to render them capable of operating successfully the small compact type of electrically propelled chair which is on the market. This chair is propelled by a low-voltage fractional horsepower motor which derives its power from two car batteries. Steering is by means of a vertical column with two hand grips arranged like the top of a 'T', one of which by twist-grip control enables the choice of forward and reverse speeds to be made. This steering column turns the small power unit and the attached driving wheel and, owing to the fact that this wheel can be turned either way with the total arc of over 180°, the chair is very manœuvrable and can turn on its own axis. Such a chair is necessarily very much more expensive than the hand-propelled variety and is not yet available under the National Health Service, presumably due to the very real danger of its being 'over prescribed'.

Nevertheless, there is a small but very real category of disablement where people genuinely need such a chair. It should be emphasized that this number is extremely small and in this county we have been fortunate in receiving help from the county medical authorities who, under the permissive powers of Section 28 of the Act, have actually supplied one of this type of chair for an elderly handicapped rheumatoid patient, thereby enabling her to continue to live at home and do the cooking for her elderly brother.

OUTDOOR CHAIRS

Outdoor chairs are supplied under the National Health Service on the recommendation of a hospital consultant and consist of:—

(a) Hand-propelled tricycles, either of the lever or rotary types.
(b) Foot-propelled tricycles.
(c) Electrically propelled tricycles.
(d) Motor-propelled tricycles.

Before supplying the last two—i.e. the power-propelled tricycles—the Ministry of Health requires the case to be in one of the following four categories:—

(i) The patient has suffered from amputation of both legs, at least one above the knee.
(ii) The patient is suffering from paraplegia.
(iii) The patient is suffering from a disability which results in the total or almost total loss of use of both legs.
(iv) The patient is badly disabled and requires a machine in order to obtain or retain employment.

The Ministry stresses that 'there is reason to believe that in the course of time it has become increasingly to be assumed that the mere fact that a patient falls into one of the first three categories, automatically entitles him to be provided with a power-propelled machine. This was never the intention'.

Further information can be obtained from the Ministry of Health and was issued to Regional Boards in Circular RHB (53) 98.

REVISION CORNER

THE DIAGNOSIS OF GOUT

GOUT, or podagra, as it was first known when occurring in the big toe, has been recognized since the earliest times. Up until the early part of this century a multitude of diseases with little or no connexion was ascribed to gout. A purist reaction then confined the diagnosis to a very typical joint pattern, but lately it has again been recognized as having some relationship to an arteriolar nephrosclerosis and hypertension apart from the presence of urinary calculi. In spite of much research on purine metabolism using tracer elements, we still do not know the etiology of gout. A familial hyperuricæmia certainly may be involved. Attacks are often triggered off by some form of stress which may be more or less specific to an individual: this may be trauma, worry, fatigue, excitement, infection, or an allergy, often to a food or a particular type of alcohol.

CLASSIFICATION

Gout has been divided into a primary and a secondary form. The precipitating factor in the latter is a nuclear breakdown such as occurs in leukæmia, polycythæmia and radiotherapy. A fulminant tophaceous type, starting in youth, usually with a strong 'family history', may be so different from the common type as to warrant classification as a separate syndrome.

DIAGNOSTIC CRITERIA

At present there is no one diagnostic criterion for gout but, especially since the treatment of gout has become so satisfactory with the new therapeutic agents, its early recognition is of great practical importance. The patient is usually a male, and often of the 'full-blooded' stocky type with a family history of gout, but the condition often appears to skip a generation. More important is the character of the attack, and here a history of early attacks in a long-standing case is vital. The onset, perhaps precipitated by one of the trigger factors already mentioned, is sudden and severe. The pain is likened to being caught in a vice, and tenderness is extreme, causing apprehension when anyone approaches. Any joint, but more commonly the big toe, may be affected; it is hot, dry, swollen and often red. In all early attacks there is complete recovery within three weeks or, with proper therapy, within three days. After many attacks there is a tendency for them to become less acute and to last longer, leaving residual changes.

The plasma, serum, or blood uric acid is often raised and when this is so it clinches the diagnosis of a typical attack. Occasionally the uric acid may be repeatedly normal, especially if the patient has been taking large doses of

aspirin or other salicylates. There is no anæmia in the early cases, the sedimentation rate is apt to vary rapidly and the differential agglutination test (D.A.T.) is normal in the uncomplicated case. Tophi, when visible, are diagnostic, but they can resemble calcinosis or, when breaking down, an abscess. X-rays are seldom diagnostic where there is doubt on clinical grounds, but they may help to confirm the diagnosis. They are often confused with rheumatoid arthritis and can be simulated by sarcoidosis, infective dactylitis and even Sudeck's atrophy.

A rapid remission with full doses of colchicine may suggest the diagnosis, although large doses of phenylbutazone will cause an even quicker remission. It might be mentioned here that the newer uricosuric agents, sulphinpyrazone, zoxazolamine and 'urelim', increase the incidence of attacks for the first six weeks before their benefit is seen. Their uricosuric effect is inhibited by aspirin and the salicylates, but paracetamol does not do this. Attempts have been made to provoke attacks of gout with a ketogenic diet and corticotrophin-withdrawal, but no test has been found to be satisfactory in the doubtful cases in which it is required.

It will thus be seen that the diagnosis of gout is made by the summing up of a number of points, the character and course of the attack being of first importance, and confirmation with a raised plasma uric acid being most helpful when present. It should be remembered, however, that, apart from the tendency of attacks to be less typical in the chronic case, they may also be modified by septic foci elsewhere. In a number of cases joints have remained painful and swollen for months, raising the differential diagnosis of a rheumatoid condition, yet have settled at once after the draining of an antrum or removal of a frankly septic tooth.

DIFFERENTIAL DIAGNOSIS

Typical gout may most easily be confused with an acute episodic onset of rheumatoid disease. A raised plasma uric acid will greatly favour gout whilst a positive D.A.T., if present at this early stage, will make the diagnosis of rheumatoid arthritis almost certain. It must be recognized, however, that the latter is common and that stress will provoke either or both conditions in susceptible soil. Other conditions which must be considered are rheumatic fever, uncommon for the first time in an adult and usually preceded by a streptococcal infection, and gonococcal arthritis, only to be missed if forgotten. Not infrequently an acute pyogenic infection has been suspected, even to the point of surgical intervention being sought, and when a deeper situated joint has been involved, such as the hip, a pathological fracture has been the first thought of the practitioner on seeing the case. Owing to the frequency with which the big toe is affected, gout is less commonly missed at this site, but a bunion associated with an acute hallux rigidus is commonly thought to be gout; the onset, however, is less acute and the condition will not settle completely.

CONCLUSION

The importance of the diagnosis of gout rests on the efficacy of its treatment. There is no other arthritic condition in which one can be so certain of having a grateful patient once the diagnosis is made and proper treatment instituted.

G. D. KERSLEY, T.D., D.L., M.D., F.R.C.P.
Physician, Royal National Hospital for Rheumatic Diseases, Bath, and Bristol Royal Hospitals.

WAX IN THE EARS

THE diagnosis and treatment of wax in the ear cannot by any stretch of imagination be classed among the higher flights of medical practice. Reasonable expertise in its management will, however, prevent a certain amount of discomfort and morbidity and is productive of grateful patients without undue exertion.

CAUSE AND FUNCTION

Aural wax, or cerumen, consists of a mixture of the secretions of the sebaceous and ceruminous glands situated in the cartilaginous part of the external auditory meatus. With this is also found a certain amount of desquamated epithelium and some hairs. The factors controlling the production of aural wax are not known and it varies greatly in consistency and amount from one individual to another.

Similarly, there is uncertainty regarding the exact function of the wax but it is almost certainly in the nature of a protection by preventing the entry of dirt, foreign bodies and organisms. It has, so to speak, a fly-paper effect, the foreign material adhering to it and then being carried towards the opening of the meatus by the movements produced by mastication, yawning and speaking. Other suggested functions are lubrication of the skin of the meatus and removal of epidermal scales. It has also been suggested that aural cerumen contains a direct antibacterial factor but this has been disputed. In support of these various theories is the fact that wax is rarely found in conjunction with external otitis.

SYMPTOMS

The presence of even quite large and solid plugs of wax in the ears is often quite symptomless. When it does produce symptoms, however, these usually consist of varying degrees of deafness or a feeling of fullness. Occasionally the complaint is of irritation while in some cases wax can be the cause of mild, or even severe, vertigo. These symptoms usually develop slowly but, if for any reason the wax becomes suddenly impacted or swells from contact with water, the onset can be sudden and accompanied by pain.

TREATMENT

Treatment consists in removal by syringing or instrumentation. Syringing is the method of choice, and instrumentation is used when syringing fails or is contraindicated. Various remedies for removal of wax have from time to time appeared on the market but none has proved really efficient, and in some cases they have tended to irritate the skin.

SYRINGING

The technique of syringing is too well known to require detailed description but the following points should be borne in mind. The solution—saline, sodium bicarbonate or plain water—should be at, or just above, body temperature and care should be taken that there is no air in the syringe. A good light is helpful and the ear should be held upwards and backwards to straighten the meatus. The amount of force used can only be learnt by experience, the pressure naturally having to be sufficient to dislodge the wax, whilst intermittent pressure is often more effective than a steady stream. The dangers of damaging the drum are well known and probably somewhat exaggerated. When damage does occur it is not always the result of excessive force of the stream of fluid but may be caused by inexpert handling of the syringe itself.

If the wax proves resistant to removal it is better not to persist but to give the patient some oily drops to soften it and repeat the syringing after a few days. A useful prescription for the drops is:—

Dilute ointment of mercuric nitrate B.P.C.	20 grains (1.2 g.)
Olive oil	to ½ ounce (15 g.)

After syringing, the ear should be dried with clean cotton-wool on a wool carrier or using a pair of fine forceps. This may not be necessary in the ordinary case but should always be done if there is any suggestion of irritation or infection of the skin of the meatus. In the latter type of case or when there is a history of external otitis, the use of oily drops once or twice following syringing will help to prevent any flare-up.

Contraindications to syringing are the presence, or suspected presence, of underlying aural disease, such as a perforation, whilst abnormalities of the meatus such as stenosis or osteoma formation often prevent its being effective. It is also better not to syringe the ear if there is a history of recent external otitis, but it must be borne in mind that a single syringing followed by thorough drying may be less likely to reactivate external otitis than the trauma of instrumentation.

The *complications* of syringing are rarely serious, but damage to the drum or meatus can occur. Some patients experience quite severe vertigo, especially if the fluid is too cold, and external otitis is occasionally caused.

INSTRUMENTAL REMOVAL

Instrumental removal of wax is indicated when syringing fails or is contraindicated and should be carried out with proper lighting and instruments.

It may be the method of choice in cases with meatal abnormalities, and also in small children. In some of these cases it may be advisable to carry out the procedure under a general anæsthetic. Occasionally a solid plug can easily be removed with aural forceps, but apart from these instances the procedure is better carried out in an Ear, Nose and Throat Department.

PREVENTION

There is no known method of preventing the recurrence of wax, but in a subject who produces wax the occasional application of oily drops in the ear keeps the wax soft, prevents impaction and probably assists natural removal.

J. W. S. LINDAHL, T.D., M.CHIR., F.R.C.S.
Surgeon, Aural Department, The London Hospital.

NOTES AND QUERIES

The Cœliac Syndrome

QUERY.—I should be grateful if you could tell me what tests, laboratory or otherwise, there are to decide whether a child suffering from the cœliac syndrome is cured or not. The child in question is nearly six years old and he has been on a gluten-free diet for four years. His height is progressing normally.

REPLY.—There are no simple tests to show whether a patient with cœliac disease has fully recovered or not. The gluten-free dietary regime, introduced in 1952, has not been used long enough to justify definite conclusions regarding the necessary duration of its use, but it seems clear that some mildly affected children can resume a normal diet after several years of the special regime. A normal rate of growth is the most valuable criterion of satisfactory digestion and good progress in these cases, and the height should be carefully recorded at regular two-monthly intervals and plotted on a standard growth chart to illustrate the growth course of the patient. Such a chart is now available, prepared by J. M. Tanner and R. H. Whitehouse, University of London, Institute of Child Health, for The Hospital for Sick Children, Great Ormond Street, London, W.C.1. Any deviation from the normal course is clearly shown by this method, and a check in the rate of growth following resumption of normal diet would indicate a relapse and the necessity of continuing the special gluten-free diet for a further period. Relapse could be detected sooner, though less easily, by doing a fat balance on the gluten-free diet and another within a few weeks of resuming normal diet to demonstrate any deterioration of fat absorption below the normal figure of 90% to 95%.

I would be inclined to continue the gluten-free diet in this particular patient for a few years longer before challenging cure with a normal diet, as there would probably be a considerable risk of relapse at the age of six years. Nevertheless, such a trial would not cause any lasting harm in a child who had not yet recovered if carefully observed.

PROFESSOR J. L. HENDERSON,
M.D., F.R.C.P.ED.

Pyelonephritis

QUERY (from a reader in Malta).—About five weeks ago, a 4-year-old girl had an attack of acute tonsillitis. The urine contained albumin, white blood cells, pus, an occasional red blood cell, but no casts. I kept her in bed on a diet of milk and fruit and gave her procaine penicillin injections, 900,000 units daily for seven days. The tonsils shrank, the purulent foci disappeared but the urine, which was normal on the fourth day of treatment, once again contained albumin, pus, and a few red blood cells in the second week. I then prescribed oxytetracycline syrup, 125 mg. every six hours for seven days. After four days the urine became normal, but now—five weeks from the onset—the urine once again contains albumin and pus. I am worried as I am now afraid lest the condition of her kidneys may become chronic.

What alternative treatment do you suggest? Her tonsils are a little congested, but there are no foci with pus. Is removal of the tonsils advisable now? Would potassium citrate and sodium bicarbonate mixture do any good? Her

general condition is good but I should be grateful for advice on further treatment.

REPLY.—The findings mentioned suggest a diagnosis of pyelonephritis rather than nephritis, especially as the main abnormality of the urine five weeks after the onset is the presence of albumin and pus. Helpful additional data would be a record of the blood pressure, presence of œdema, blood chemistry (urea, plasma proteins, cholesterol) and rather more detailed examination of the urine to include approximate amount of albuminuria, numbers of red and white cells as shown by an Addis count or chamber count, and a catheter specimen to identify an organism. Although there is a history of tonsillitis, I think on balance that the urinary findings make pyelonephritis more likely. It is important from the start to establish an accurate diagnosis, and in particular to identify an organism and its sensitivity to antibiotics. The appropriate antibiotic should then be given for about a month, and the urine checked at intervals to see that it returns to normal, and also remains normal after treatment has been stopped.

The question of an underlying congenital renal abnormality should be considered, especially when the urinary tract infection is resistant to treatment, relapses or recurs. If this occurs, intravenous pyelogram and possibly retrograde studies may be indicated.

In summary, I would suggest complete examination of a catheter specimen of urine and, if the diagnosis of pyelonephritis is established, appropriate antibiotic treatment. If the urinary findings suggest nephritis (as shown clinically and by an excessive number of red cells in an Addis count), the patient should be resting but not of necessity in bed, and gradually be allowed more activity as the Addis red cell count decreases. There is not a lot of evidence to suggest that reasonably early activity harms these patients, and when the Addis red cell count is about ten to five million, normal activity can be advised.

I do not think that tonsillectomy is indicated unless the patient has repeated attacks of tonsillitis, and I would not especially recommend potassium citrate and sodium bicarbonate mixture although, if the infection is one due to *E. coli*, it may be of benefit.

M. C. JOSEPH, M.D., M.R.C.P., D.C.H.

Oliguric Renal Failure

QUERY.—Would you please explain the rationale of giving 2 to 4 pints (1 to 2 litres) of fluid by mouth as a first-aid measure for 'crush syndrome' (as mentioned in the 'Manual of First-Aid' of the Red Cross and St. John) when the treatment of established anuria is surely the restriction of fluid?

REPLY.—Treatment should always be based on diagnosis. The 'Manual of First-Aid' of the Red Cross and St. John is based on this principle. Unfortunately diagnosis in many traumatic conditions is beyond the ability of first-aiders.

The diagnosis of oliguric renal failure (the term 'crush syndrome' is only of historic significance) can never be made within a few hours of injury as the condition does not set in until a day or so after injury. The section on 'Crush Injury' in the most recent 'Manual of First-Aid' could with considerable advantage be deleted completely. The dangers of its inclusion are very real. A first-aider after reading it may consider any 'crush' injury, be it to the great toe or to a finger, requires fluid by mouth, yet the treatment of such injuries may be early surgery under general anæsthesia. *The overriding rule for all first-aiders in all injuries should be to give nothing by the mouth until it is known that early surgery is not necessary, since vomiting followed by obstruction to the airways is a very real danger.*

If the Manual is hinting that fluids by mouth help to prevent renal failure this in itself is debatable and has no background of scientific proof. The most important established fact about renal failure following injury is that it is most often due to oligæmia. The first-aid care therefore is to get the patient as quickly as possible to hospital for a blood transfusion to make good his depleted blood volume.

WILLIAM GISSANE, M.B., CH.M., F.R.C.S.

Convergent Strabismus

QUERY (from a reader in Cyprus).—A girl, aged 3 years, was first noticed to have a convergent strabismus of the right eye about six months ago. She was referred to an ophthalmic surgeon who examined her under a mydriatic and prescribed full correction glasses, right and left + 6.00DSph. At first the angle of squint on the majorsynoptophore varied from 0 to +4 without glasses and 0 with glasses.

She wears her glasses constantly and they need no change at present. Visual acuity is 6/9 with glasses in both right and left and she has full binocular vision. No other abnormality can be found in her eyes and she is otherwise a healthy child. The parents are very anxious to know whether anything more could be done at this stage, and I should be grateful for advice.

REPLY.—As this child has full binocular vision while wearing glasses, and the angle is 0°,

presumably both at 6 metres and at ⅓ metre, there is no indication for surgery at this stage. As the child grows older, the hypermetropia will probably decrease, and an adjustment of the glasses annually will be required.

S. J. H. MILLER, M.D., F.R.C.S., D.O.M.S.

Psychological Impotence

QUERY.—Two brothers, aged 28 and 30, are suffering from psychological impotence. Neither has ever achieved successful intercourse. The spermatic count of one of them is perfectly normal. Both are professional people, unmarried, and in otherwise good health. The other siblings are normal.

(1) What is the best treatment?

(2) Is hypnosis of any value?

(3) Do you think that a sympathetic blocking agent might help, even though it sometimes causes failure of ejaculation?

(4) What is the prognosis?

(5) Is it a known feature of this condition to affect brothers? Does this affect prognosis?

(6) Would you kindly mention some references and any detailed study of this condition?

REPLY.—There are two main types of impotence. First, failure may be temporary—indeed this is common; or secondly, it may be due to poverty of libido in an asthenic, unassertive type of male. The sexual apparatus is an exceedingly delicately balanced area of the autonomic nervous system and very susceptible to anxiety. Fear of impotence can bring it about. Excessive respect for the female partner, or disgust, can create anxiety as can also prejudice, fear of venereal disease and of pregnancy resulting. Those with strict puritanical upbringing can have such rigid standards that they may lead to inhibition of sexual feelings or to an idea that they are a sin. Those cases with poor libido may have lack of interest and may be poorly orientated heterosexually and may be more interested in their own sex. All degrees of impotence are found from lack of erection to premature ejaculation or to failure of orgasm and subsequent ejaculation.

To answer the questions seriatim:—

(1) For cases with ordinary libido and a mature, emotionally balanced personality, discussion of the sexual act and the usual techniques with an attitude of sanction of the normality of heterosexual relations and of the capacity of an ordinary male to achieve success, may be sufficient. If ordinary ethical standards decree that intercourse should be confined within marriage, this should be respected. In fact, premarital intercourse has been followed by impotence in marriage although the reverse sometimes occurs. A man may be potent with one type of woman and not with another. Reassurance must be given that success does not necessarily come at the first attempt.

For other cases, in which the causes of impotence are deeper in the patient's personality, in his relationship with women right back to childhood and in his difficulty of adaptation to the male role, more intensive psychological treatment is necessary.

(2) Hypnosis can help with suggestible patients, when the condition is not very deeply seated.

(3) The difficulty in prescribing medicaments is in reaching the right dose. During the 1939-45 War we found the best drug to give the soldier to increase his confidence was not the amphetamines but quinalbarbitone sodium in a ¾-grain (50 mg.) dose. Anything stronger had too sedative an effect. The tranquillizers are unpredictable in their action.

(4) The prognosis in ordinary personality is reasonably good. In those with disturbed relationships with a parent, especially mother-fixation, a lengthy period of treatment is necessary. Success cannot always be guaranteed though some maturing of the personality can result. Some cases do not become potent until after the death of the mother.

(5) In a family where the mother has a strong personality and the father is unmasculine and unassertive, more than one son has failed to achieve identification with the male role. It is more common for sons who had difficulty in developing their masculine function because of parental differences to have problems in achieving sexual maturity. Prognosis for short-term therapy would not be so good in these cases; even with long-term psychotherapy one would be very guarded in promising success, but it should be tried.

(6) The best study is 'The Functions of the Sexual Apparatus and their Disturbances' by Benedek in 'Psychosomatic Medicine', edited by F. Alexander. Most good textbooks of psychiatry summarize the knowledge on the subject. The works of Ellis, Allen and others discuss it. The National Marriage Guidance Council (58 Queen Anne Street, London, W.1) publishes a small pamphlet on 'Sexual Difficulties in the Male'.

ALFRED TORRIE, M.B., D.P.M.

Pulmonary Infarction

QUERY.—Multiple small infarcts of the lungs occur sometimes after operations in elderly people. Can these infarcts be a cause of post-operative pneumonia? What preventive measures are advised? Last year I did two necropsies on men who died of postoperative pneumonia after prostatectomy. In each case it seemed to

me there had been infarcts of the lungs and I believe the infarcts became infected and gave rise to the pneumonia. I feel that four days after prostatectomy in elderly men anticoagulation should be started.

REPLY.—Pulmonary infarction is not nowadays a common complication of prostatectomy. It does, of course, occur, but the frequency of its occurrence has been greatly lessened by early mobilization of the patient. I am entirely against anticoagulation therapy in the early days after prostatectomy. Some years ago it was given to two of my patients, each of whom had quite a severe secondary hæmorrhage. I cannot but think this was influenced by the anticoagulation therapy.

A. W. BADENOCH, M.D., CH.M., F.R.C.S.

Thyrotoxicosis and Diabetes Mellitus

QUERY.—I should be grateful for advice in the case of a patient, aged 36, who recently came under my care. She developed diabetes mellitus in 1945, and this was controlled by 12 units of soluble insulin twice daily. In May 1956 she was given a course of radioactive iodine for thyrotoxicosis. Apparently this treatment was overdone and she developed myxœdema, for which she has been receiving one tablet of thyroxine sodium B.P. daily. This apparently is not sufficient and she definitely requires a bigger dose.

As she proved to be a difficult diabetic to bring under control, I should be grateful for an opinion as to the effect on her insulin requirement of increasing the dose of thyroxine sodium.

REPLY.—There seems to me to be only one possible answer in this case: namely, that the patient should be given sufficient thyroxine to control her thyroid trouble and that the dose of insulin be adjusted accordingly. Increasing the thyroxine will probably lead to some increase in insulin requirement, but probably not very much.

WILFRID OAKLEY, M.D., F.R.C.P.

PRACTICAL NOTES

Metronidazole in Male Trichomoniasis

THE most effective treatment for trichomoniasis in the male urogenital tract is metronidazole, according to L. Sylvestre and his colleagues (*Canadian Medical Association Journal*, December 3, 1960, **83**, 1195) who report their results in 37 cases. Of these, 21 had trichomonas urethritis, eight had trichomonas urethritis and trichomonas prostatitis, three had trichomonas prostatitis, and five urethritis without trichomoniasis but their female partners harboured *T. vaginalis*. The duration of infection ranged from under six months to eighteen years (one patient). Administration of one 250-mg. tablet each morning and evening for ten days resulted in cure in every case. These 'remarkable results' are attributed first to the drug itself and also to the fact that 'in no instance did we neglect to locate the source of infection'. In this way, the partners of 25 of the 37 patients were traced and treated simultaneously. Results were rigidly controlled by examination of fresh smears on slides and also by culture, and the follow-up period lasted for twelve weeks or more in ten cases. The drug was well tolerated, and blood counts made before, and ten days after, treatment revealed no changes.

Ergotamine Inhalation for Migraine

AEROSOL ergotamine tartrate for inhalation proved to be 'a very convenient and reasonably efficacious weapon' in the treatment of migraine, in the experience of J. R. Graham and his colleagues (*New England Journal of Medicine*, October 20, 1960, **263**, 802). They compared its efficacy in stopping headaches of both the 'ordinary' migraine type and also 'Horton's headache', or so-called 'histamine cephalgia', with that of sublingual and rectal administration of ergotamine. The preparation used was 'medihaler-ergotamine', a single 'puff' of which delivers 0.36 mg. of ergotamine tartrate in a fine inhalable mist. Results in 'ordinary' migraine were classified as 'good' (headaches stopped within three hours), 'fair' (headache stopped within three to six hours), and 'poor' (headache not stopped in six hours). In ordinary migraine the inhalation produced a slightly higher percentage (57%) of 'good' results than the ergotamine tablets (45%) but lower than the ergotamine-caffeine suppositories (73%). Results were 'fair' in 15%, 24% and 17%, with the three preparations respectively, and 'poor' in 28%, 31% and 10%, respectively. Some patients required only one 'puff' of inhalation

but others required two, and later a third and fourth. In Horton's syndrome the inhalation provided relief from 'this excruciating type of pain' within half an hour in 71% of 114 trials in 12 patients. The incidence of side-effects was somewhat greater with inhalation than with administration by other methods, being mild in 10%, moderate in 1%, and severe (asthma) in 1%. The most common side-effect was nausea and in a few cases vomiting. Muscle cramp and abdominal pain were infrequent complications but a few patients complained of a 'bad taste', one patient finding this so disagreeable that she would not use the inhaler, although she found it effective. One patient, who was subject to asthma, thought that the inhalation precipitated an attack.

Cortisone in Pulmonary Sarcoidosis

THE effect of long-term cortisone therapy on pulmonary sarcoidosis has been investigated by P. Peltona and A. Koskimies (*Annales Medicinæ Internæ, Fenniæ*, 1960, **49**, 201) in a series of 30 cases. Cortisone or one of its derivatives was administered to 13 patients, starting with 50 to 75 mg. of cortisone, or 10 to 15 mg. of prednisone, daily. This dosage was maintained until the patient's condition improved, when it was gradually reduced to 'small maintenance doses'. The duration of corticosteroid therapy ranged from three months to three years (average 8.5 months). Six of these patients received streptomycin and PAS or isoniazid in addition to corticosteroids. The remainder of the patients (17) acted as controls. The results show that 12 of the 13 patients receiving corticocosteroids showed 'considerable improvement, in some cases even normalization of the subjective symptoms, the rœntgenological findings and the pulmonary function tests'. The only patient who did not respond was one of the long-standing cases. The patients receiving antituberculous therapy as well as corticosteroids responded no better than those receiving corticosteroids alone. Of the control group, five showed 'slight improvement'; the condition of the others remained unchanged or deteriorated. In no instance had corticosteroid therapy to be stopped on account of side-effects. The authors conclude that 'the results seem to indicate that cortisone therapy brings relief especially to fresh cases, and even considerable relief, in pulmonary sarcoidosis and its symptoms. Long-term therapy may check the progress of the disease even in long-standing cases and the recurrence of symptoms after cortisone therapy of short duration suggests clearly the necessity of long-term therapy'.

Corticosteroids in Surgery

STRESS is laid by R. I. S. Bayliss (*British Journal of Anæsthesia*, November 1960, **32**, 529) on the necessity of including in the preoperative examination of every patient questions to discover whether or not the patient has ever had systemic treatment with corticosteroids. This often means inquiring if the patient has suffered from any of the diseases commonly treated with cortisone or its analogues: e.g. asthma, hay fever, rheumatoid arthritis, urticaria. As is pointed out, 'too many patients are unaware of the nature of therapy received in the past and the physician who prescribes corticosteroids has a moral obligation to explain to the patient the physiological consequences and to provide him with a written note of warning and instruction'. The postoperative risk which such patients run is that of developing adrenocortical insufficiency. All synthetic analogues of cortisone and hydrocortisone cause pituitary inhibition and secondary adrenal suppression. Any patient currently having steroid therapy is particularly at risk, but what is not generally realized is that 'the risk persists' for weeks or months after stopping treatment, even when the dosage is gradually reduced. 'Irreversible shock', it is stated, has been described after minor surgical procedures in patients who have stopped steroid therapy for as long as two years, but have sufficient adrenocortical function to allow a life free of symptoms under more ordinary circumstances.

Varicocele in Schoolboys

'VARICOCELE is a relatively common condition amongst adolescent schoolboys', according to J. Stuart Horner (*Medical Officer*, December 23, 1960, **104**, 377). In a group of 1,211 schoolboys between the ages of 11 years and 15 years 11 months, he found a total of 193 varicoceles, which gives an incidence of 15.9%. All but one were on the left side. Sixty-three of them were classified as mild, 87 as moderate, and 43 as marked. The varicocele did not appear to be associated with any symptoms. No significant difference was noted between the incidence of other genital defects and inguinal hernia among the boys with a varicocele, and those without one. No instance of varicocele was found on routine examination of a group of 132 schoolboys between the ages of 3 years and 10 years 11 months.

Ammonia Content of Stored Blood

THE ammonia content of stored blood rises from normal levels of 50 to 60 mcg. per 100 ml. to levels of 290 to 335 mcg. per 100 ml. on the 18th day, according to R. W. Beal (*Medical*

Journal of Australia, October 29, 1960, **ii**, 691). Although the ammonia content of a litre of blood stored for two weeks (assuming the blood ammonia level to be 250 mcg. per 100 ml.) would be approximately equal to only 30 mg. of ingested ammonium chloride, which is not a large amount, it is pointed out that 'whole bottled blood with a high ammonia content is far more likely to cause a significant rise in the blood ammonia level of those patients with cirrhosis who are bleeding profusely from varices into the alimentary tract, and who need large volumes of blood to keep them alive'. In order to reduce the risk of precipitating hepatic coma therefore, it is recommended that 'when a transfusion is given to a known cirrhotic patient, or to a patient who is suspected to be bleeding from varices or other gastro-intestinal lesion and is approaching hepatic coma', blood as fresh as possible should be used. 'This principle', it is added, 'applies even more strongly when an heroic attempt is made to salvage adult patients from hepatic failure by exchange transfusion'.

Control of Sonne Dysentery

In the control of Sonne dysentery and allied infections the adoption of the following routine 'has been followed by a promising degree of success, under conditions that constituted a severe test', according to Ian Taylor (*Medical Officer*, December 2, 1960, **104**, 339).

(i) After ascertainment of the drug sensitivity of the infecting organism, the administration of a 'prophylactic' course of the chosen drug to contacts, in order to reduce the amount of fæcal infection.

(ii) The use of hexachlorophane dusting powder in the form of the daily dusting of the skin of the abdomen, buttocks and perineum of all children, in order to reduce the amount of infection of the skin and clothing, and thus diminish the risk of infecting the hands.

(iii) The use of hexachlorophane soap for hand-washing by adults, children and all staff in order to reduce hand carriage of infection.

Supervoltage X-ray Therapy of Intracranial Tumours

The following conclusions are based by Arthur Jones (*Annals of the Royal College of Surgeons of England*, November 1960, **27**, 310) on an analysis of the results in the 139 cases of 'primary intracranial tumour', excluding pituitary tumours, treated by supervoltage x-ray therapy at St. Bartholomew's Hospital between 1937 and 1953, the results being assessed up to 1958: i.e. a minimum follow-up period of five years. The main benefit of such therapy is seen in the treatment of localized tumours of the posterior third ventricle (causing the 'pinealoma' syndrome). Other 'noticeably beneficial results' were obtained in glioma of the optic chiasm and in ependymoma. Of the astrocytomas, although prolonged survival occurred with grades 1 and 2, the greatest radiotherapeutic response was in those of grade 3, the beneficial factor being a degree of anaplasia short of the malignant picture of glioblastoma multiforme. In glioblastoma multiforme, a proportion of tumours are moderately radiosensitive, but the response is usually transient. Youth, however, is 'often associated with comparative longevity, and young patients also respond better to irradiation'. Of the non-gliomatous tumours, there were 'important beneficial effects of supervoltage irradiation' in inoperable meningioma and hæmangioma, particularly in the posterior fossa. On the 'quality of survival' the verdict is: 'For the majority of patients survival is associated with greater or less affective and neurological deficit, even if economic work is resumed'.

Javelin Thrower's Elbow

Although apparently a common complaint the condition known as 'javelin thrower's elbow', which is characterized by pain in the elbow during and after throwing, appears to have received scant attention in the literature. Describing a case in a leading woman javelin thrower, J. E. Miller (*Journal of Bone and Joint Surgery*, November 1960, **42-B**, 788) points out that there are two forms of this condition, the most common being that caused by recurrent strain of the medial ligament due to incorrect throwing technique. Treatment consists of improving the throwing technique, although local anæsthesia produces complete but temporary relief, and hydrocortisone injection may give partial or complete relief. The second form occurs in expert throwers and is the result of hyperextension of the elbow at the end of the throw, causing injury to the tip of the olecranon. When the patient in this report first presented for treatment she stated that she first developed symptoms twelve months after taking up the sport and some months later had received a course of five injections of hydrocortisone which gave considerable relief for a time, but pain later recurred and became so severe that it prevented her from throwing. The elbow was normal on clinical examination but radiography revealed irregularity at the tip of the olecranon which at operation was found to be fractured about 8 cm. from the tip. The small fragment was removed, the triceps reconstituted, and two months later the patient 'surpassed her previous best throw'.

REVIEWS OF BOOKS

Diseases of the Newborn. By ALEXANDER J. SCHAFFER, M.D. Philadelphia and London: W. B. Saunders Co., 1960. Pp. 878. Illustrated. Price £7.

PUBLICATION of this large new book on diseases of the newborn is a notable event which will be welcomed by all concerned with the care of the new-born infant, for it has been written by a leading authority in this increasingly important field. Dr. Schaffer has had wide and intensive experience of neonatal clinical practice and teaching in Baltimore for over thirty years and he has performed a valuable service to medicine, and pædiatrics in particular, by making available to others his vast store of knowledge and mature wisdom. The book is essentially concerned with disease and is very comprehensive—in fact it is now the most comprehensive book on diseases of the newborn.

The general introduction discusses the aims of 'Neonatology'. It gives an excellent account of routine history-taking and examination of the new-born infant and reviews the principles of treatment. The first section deals with general aspects of the normal and abnormal new-born baby and is followed by the following fourteen sections: 'Disorders of the respiratory system', 'Disorders of the cardiovascular system', 'Disorders of the gastro-intestinal tract', 'Disorders of the genito-urinary tract', 'Disorders of the endocrine system', 'Disorders of blood, blood vessels and lymphatics', 'Jaundice', 'Disorders of the head, spine and central nervous system', 'Infections', 'Disorders of nutrition', 'Disorders of the skeletal system', 'Disorders of the skin', 'Disorders of the eye', and 'Miscellaneous disorders'. The notable section on 'Disorders of the cardiovascular system' consisting of 110 pages was written by the author's colleague, Dr. Milton Markowitz. Four appendixes deal with 'Principles of full-term and premature infant care in nurseries', 'Resuscitation in obstetrical delivery room', 'A plan for the management of new-born infants with suspected erythroblastosis', and 'Pharmacopeia for the new-born period'. All contain valuable information.

This is a beautifully produced book which is liberally illustrated with clinical photographs, x-ray reproductions, photographs of pathological specimens, diagrams and graphs, and the references are ample and well chosen.

Resuscitation of the Newborn Infant. Edited by HAROLD ABRAMSON, M.D. London: Henry Kimpton, 1960. Pp. 274. Illustrated. Price 75*s*.

THIS is a book of composite authorship, all but one of the twenty-four contributors working in New York, and skilful editing almost but not quite hides the identity of the writer of a particular section. Perinatal wastage is attracting much attention in many parts of the world and death from respiratory failure offers a challenge to the medical profession. Hence this book, and of special interest is the growing part played by what are (unfortunately) called 'anæsthesiologists'. Chapters follow a consecutive path from statistics through physiology and pathology to factors involved in anoxia and then to resuscitation procedures. A final chapter skilfully summarizes problems awaiting solution. There is a glossary which helps in part to make some terms (but not all names of drugs) more easily understood but the definition of live birth might have conformed more closely to official international usage. A blue pencil could have cut out some extraneous matter such as, for example, mention of carcinoma of the cervix and cholecystitis in the mother, and also some of the laboratory procedures (e.g. blood phenylalanine levels) which seem scarcely relevant to the main theme. Such curtailment might have reduced the price which seems high for the size of the book. These matters apart, it must be welcomed as an excellent guide for all concerned with the new-born baby.

The Ear, Nose and Throat Diseases of Children. By J. F. BIRRELL, M.D., F.R.C.S.ED. London: Cassell and Co. Ltd., 1960. Pp. 383. Illustrated. Price 50*s*.

THIS volume is well set out, and the printing and illustrations are excellent. The subject-matter concerns the common conditions met with in pædiatric otolaryngological practice, and it will be found particularly useful to practitioners and to those preparing for specialist examinations. The author's account of otomastoiditis will not meet with approval in all quarters, but on the whole he makes his meaning clear. It is to be regretted that there is no account of speech disorders in children, as the otologist specializing in deaf children is more and more called upon for help in this field.

The Tonsils and Adenoids in Childhood. By DONALD F. PROCTOR, M.D. Springfield, Illinois: Charles C Thomas, Oxford: Blackwell Scientific Publications Ltd., 1960. Pp. 70. Illustrated. Price 60*s*.

THIS is the first volume of the author's work on pædiatric otolaryngology. It is concerned only with the various problems associated with disease of the tonsils and adenoids: their operative removal, postoperative hazards, and after-

results. Starting with a historical review of the subject, he progresses through a description of the symptoms, signs, and pathology of infection of the tonsils and adenoids, decisions as to treatment, and gives a full account of his own operative technique. Irradiation of the naso-pharynx by means of the radium applicator is mentioned at some length, but there is no account of x-ray treatment of resistant adenoid tissue. The postoperative complications receive adequate mention, though too much stress is laid upon tonsillar hæmorrhage, and not enough on the much more common adenoid bed ooze.

The book is well printed, and has many photographs and drawings which fit nicely into the text. It contains no new subject-matter, but on the other hand there are many useful practical points to be found in it. It will appeal particularly to the young otolaryngologist who is called upon to deal with these cases, and who has not, perhaps, had a lot of previous practical experience.

Clinical Child Psychiatry. By KENNETH SODDY, M.D., D.P.M. London: Baillière, Tindall & Cox Ltd., 1960. Pp. 470. Price 42*s*.

A COMPREHENSIVE study of the problems met with in child psychiatric practice in this country is welcome, and long overdue. In saying this let us not overlook the dedication of this volume to the Commonwealth Fund of America; hitherto, not only finances but textbooks have tended to come to us from the other side.

The author says a good deal in his introductory chapters on the evolving pattern of English family life, and throughout the book his emphasis is on family background. The profound significance of early parent-child relationships, their integration at foundation level into personality structure, and into reaction formation under stress, is never lost sight of. Thus, case histories form the main content of this book, and as a result it is in some ways unusually difficult to read. In an average chapter, half the text is in uncomfortably small print. This is only a small point compared with the very real difficulty of reading other people's case records, which always seem less authentic than one's own. Inevitably shortened, they contain many dogmatic statements for which supporting evidence cannot be produced. 'Mrs. N. was cyclothymic and out-turning . . . she was undemonstrative to her children . . . he was a good father, an affectionate individual, but irritable at times'. These are clinical judgments, and obviously reached after careful observation, but, as we cannot participate in the observation, the reading of some of the conclusions becomes heavy going. Fortunately, much verbatim material is included, and then the case histories come to life.

The author makes the point that his material is furnished by the ordinary problems of ordinary families, and the book is in no sense a complete index of psychopathology: much that is commonly met with in practice is omitted: for example, the psychological difficulties of the epileptic child. What is of particular value is to have the clinical field looked at so clearly from the basic standpoint of developing capacity for human relationships. This emphasis is shown in relation to such common conditions as regression, immaturity, ease or difficulty in self-expression; and in choice of symptom. The chapter headings show a progression, not of diseases or syndromes, but through the normal stages of emotional development; and the final, all too short, section on preventive mental hygiene is both original and thought provoking. The absence of both technical jargon and allegiance to only one school of thought makes this a valuable book for all workers concerned with mental health in childhood.

The Neurological Examination of the Infant. By ANDRE-THOMAS, YVES CHESNI and S. SAINT-ANNE DARGASSIES. Edited by R. C. MAC KEITH, D.M., F.R.C.P., D.C.H., P. E. POLANI, M.D., M.R.C.P., D.CH., and E. CLAYTON-JONES, M.D. London: National Spastics Society, 1960. Pp. 50. Illustrated. Price 5*s*.

FOR the doctor who practises midwifery a problem that is common and often worrying is to predict the infant's future. How does he assess 'brain damage'—on a general impression and one or two observations, or on a systemic examination of the central nervous system? Some signs have a fairly consistent significance, but the meaning of many deviations from the normal is not established. Even the methods of examination of new-born infants are not standardized, and they vary in different countries. French neurology has long been outstanding, and this small book describes its approach to the newborn. It is concerned not only with reflexes and reactions, but especially with 'tone', a concept rather different from that in use in this country. The book is descriptive, with delightful line drawings, and suggestive rather than didactic. It will interest those who appreciate how much remains to be discovered about the correlation of signs in the infant's nervous system and his subsequent development.

Active Alerted Posture. By W. E. TUCKER, C.V.O., M.B.E., T.D., M.B., F.R.C.S. Edinburgh: E. & S. Livingstone Ltd., 1960. Pp. 64. Illustrated. Price 10*s.* 6*d.*

THE author is concerned that 'countless hundreds of millions of humans' constantly assume a slumping posture. He is anxious, as he feels that this faulty posture is responsible not only for much morbidity but also for a great deal of inefficiency. He rightly believes that correct posture is an attitude of mind as well as of body and that it is an active process which, at first, must be consciously practised. His creed of 'Active alerted posture' has much to commend it and in this short monograph he explains the physiology and mechanics of posture and the benefits to be obtained by his positive approach. In fact, he states that so much depends on active alerted muscle action, that if the habit were ingrained into children before they were ten years old it is possible that many athletic and countless road accidents might be prevented.

Although written primarily for the family doctor, who he feels should know more about the principles of posture in order to explain them to his patients, this book should be read by a wider group of orthopædic surgeons, neurologists, physiotherapists and physical education instructors. Its text is easily understood and contains much common sense.

Facing Retirement. By A COUNTRY DOCTOR, M.A., M.D. London: George Allen & Unwin Ltd., 1960. Pp. 127. Price 12*s.* 6*d.*

'WHEN I retire' is a magic phrase when one is tired and frustrated. It suggests unlimited leisure to devote to neglected interests and hobbies, a time of peace and enjoyment. Yet we so often see our patients suffering from just the reverse. The age which justifies retirement has also brought some degree of mental and physical impairment, so that they are that much worse fitted to adapt themselves to the sudden and complete change of habits which retirement brings, along with a whole host of unexpected problems and a general feeling of being lost until they become adjusted to the new way of life. The author of this book has for a long time been interested in the difficulties of his elderly patients, so he is able to tell us not only the problems which are bound to crop up, but how to deal with them. His advice is candid but kind, and I particularly liked chapter 6 on relations with the younger generation—so often a cause of unnecessary sadness from a failure on each side to see the other's point of view.

Altogether this is a most useful book, which a doctor can confidently recommend to any patient nearing retirement, and which he may even consult himself when his own turn comes.

The Reluctant Surgeon. By JOHN KOBLER. London: William Heinemann Ltd., 1960. Pp. 359. Price 21*s.*

THE Reluctant Surgeon is John Hunter, but the book is also about his brother William, his parents and their children, his teachers and his pupils, his friends and his enemies, and the times he lived in. It is a very readable book because the author, though a passionate admirer of John Hunter, never loses sight of the very human, uncouth and untutored, irascible and ill-mannered, yet most lovable lowland Scot, in the contemplation of the intellectual giant. William comes out as the polished fashionable gynæcologist, with one eye on the stars and one on the main chance, who did his best to give his unpolished younger brother every chance, yet found it increasingly difficult and eventually impossible to drive with him in double harness, and finally parted from him in anger. John's eccentricities, his inability to work to a timetable, his genius for inspiring blind worship on the one hand and blind hate on the other, and the tragic event of his research-inspired, self-inflicted syphilis, must be taken in conjunction with the fact that he married one of the most charming and talented women of the time, with the treachery of his pupil and brother-in-law Everard Home, who stole his life's work before destroying his records, and with the unique devotion of Clift, who gave his life to save the memory of the man he loved and managed to save something of the wreck left by Home.

The delivery of the Hunterian Oration is the greatest honour to which a member of the Council of the Royal College of Surgeons of England can aspire. Most orators in the past have been so obsessed with the dazzling scientific achievements of the man whose memory they are honouring, that they have lost sight of the human personality whose dogged persistence, and whose determination to know everything was behind those achievements. Future Hunterian Orators, indeed all who revere the memory of 'The dear man' must read this book.

Some Reflections on Genius. By SIR RUSSELL BRAIN, BT. London: Pitman Medical Publishing Co. Ltd., 1960. Pp. 192. Illustrated. Price 30*s.*

APART from the opening essay, after which the book is named, there are few 'reflections' in the sense of the O.E.D. definition of 'deep or serious consideration' in this book. That is not to say, however, that it does not make interesting reading. Of the fourteen essays in it, nine have been published elsewhere. As one would expect

from such an ardent Johnsonian, five of the essays are devoted to the great lexicographer. There is one on Swift and another entitled 'Dickensian diagnoses'. The author has gone into the by-ways for two of his essays: Christopher Smart, one of the lesser poets of the 18th century; and Lord Monboddo, the anti-Johnsonian Scottish judge whose views on evolution were to be confirmed by Darwin a century later. In many ways the most fascinating essay of all is that on Grock, the famous clown. The account of seeing him perform in Stockholm is a brilliant piece of journalism. The pity is that the same journalistic skill is not shown in the account of the author's conversations with Epstein in 'Sitting to Epstein'. The collection concludes with two more general essays: 'Symbol and image' and 'Words'.

Written in a pleasant style, this collection of essays illustrates admirably the well-known versatility of the author. They are neither profound nor original but they will appeal to the discriminating dilettante.

NEW EDITIONS

Diseases in Infancy and Childhood, by Richard W. B. Ellis, O.B.E., M.D., F.R.C.P., in its third edition (E. & S. Livingstone Ltd., 55*s*.) is an admirable guide to pædiatrics for the medical student and the general practitioner. It hits the happy mean between the multi-author, multi-volume works for the specialist and the 'concise' works which are of little help except as a means of pre-examination revision. All the ills to which infants and children are heir, and which the practitioner is likely to encounter are covered adequately and usually in the right proportion. The style is dogmatic without being didactic. The only criticism is of the coloured reproductions which can seldom be described as 'true to life'. This is a book which can be recommended.

Antenatal and Postnatal Care, by F. J. Browne, M.D., D.SC., F.R.C.S.ED., F.R.C.O.G., and J. C. McClure Browne, M.B., B.SC., F.R.C.S.ED., F.R.C.O.G., in its ninth edition (J. & A. Churchill Ltd., 45*s*.) has undergone the careful revision which has characterized each of the previous editions. The one disappointing chapter is that on 'physical and mental preparation for childbirth': it evades the issue and is of practically no help to the practitioner who is seeking advice on the subject. Otherwise it is a book which can be recommended without hesitation as a sound practical guide. Indeed, it is probably the best book on the subject for the obstetrician—whether he be general practitioner or specialist.

Pediatric Anesthesiology, by M. Digby Leigh, M.D., and M. Kathleen Belton, M.D., second edition (Macmillan Co., 84*s*.).—Beyond the title, there is little relation between this book and the first edition, published in 1948—it has been completely rewritten and enlarged so that now the subject is discussed under four sections. The first, on pædiatric diseases as they affect the management of anæsthesia, is comprehensive and well done, although the authors stress in their preface that this is not intended to serve as a diagnostic text of pædiatric diseases, but merely to form a link between the medical knowledge of the pædiatrician and the anæsthetist. The second section, on agents and apparatus, contains sound practical advice, although the hazard of increased airway resistance due to poor design of apparatus is not sufficiently stressed. It is a pity that the third section on premedication and pre-anæsthetic preparation gives only a brief outline of the drugs available and does not discuss their respective merits and demerits. The last section, on the anæsthetic management of surgical procedures, is essentially practical and describes nearly every possible situation, with the exception of fluid replacement during surgery, which is hardly mentioned. This volume will be of particular value to the occasional pædiatric anæsthetist, covering the subject well and laying particular emphasis on safety. The layout of the book, including illustrations and references, is good, but whereas the first edition was too concise, this would have benefited from editing, so that the sections were better balanced and certain scientific explanations presented more simply.

Technique of Fluid Balance, by Geoffrey H. Tovey, M.D., second edition (Oliver and Boyd, 15*s*.).—So helpful was the first edition of this book in putting into intelligible language the intricacies of fluid balance and electrolyte disturbance that it is not surprising that a second edition is called for so soon. The whole text has been revised with care to bring it up to date, and valuable new sections have been added covering the management of the surgical and accident patient, the possible complications of intracranial injury and disease and the effects of diuretics. It is a book well worth study.

The contents of the March issue, which will contain a symposium on 'The Peptic Ulcer Problem,' will be found on page A 146 at the end of the advertisement section.

Notes and Preparations see page 281.
Notes from the Continent see page 285.
Fifty Years Ago see page 287.
World Health News see page A 15.
Motoring Notes see page A 105.
Travel Notes see page A 109.
Bridge Notes see page A 113.

NOTES AND PREPARATIONS

NEW PREPARATIONS

'MODITEN' tablets each contain 1 mg. of fluphenazine dihydrochloride, which is a phenothiazine derivative chemically designated as 4-(3-[2-{trifluoromethyl}-10-phenothiazinyl]-propyl)-1-piperazine-ethanol dihydrochloride. It is said to be 'a highly potent tranquillizer ideally suited for the management of patients seen in general practice who exhibit symptoms of anxiety and tension'. One tablet daily is said to provide 'day-long' control of symptoms in most cases. Available in bottles of 25, 100 and 500. (E. R. Squibb & Sons Ltd., Edwards Lane, Speke, Liverpool 24.)

'SANCOS' is a cough sedative, each 4-ml. teaspoonful of which contains 4 mg. of pholcodine B.P.C., 0.88 mg. of menthol B.P., 0.6 g. of glycerin B.P., and 4.2 g. of syrup B.P. It is said to be 'pleasantly flavoured' and is indicated in cases of unproductive cough. Available in bottles of 2 and 4 fluid ounces (57 and 113 ml.) and of 2 litres. (Sandoz Products Ltd., Sandoz House, 23 Great Castle Street, London, W.1.)

'TRI-ADCORTYL' ointment, each gramme of which contains 1 mg. of triamcinolone acetonide, 2.5 mg. of neomycin base (as the sulphate), 0.25 mg. of gramicidin, and 100,000 units of nystatin, is intended for the topical treatment of dermatoses 'caused, complicated or threatened by bacterial and/or monilial infection'. Available in tubes of 5 and 15 g. (E. R. Squibb & Sons Ltd., Edwards Lane, Speke, Liverpool 24.)

PHARMACEUTICAL NOTE

SMITH KLINE & FRENCH LABORATORIES LTD. announce that their trifluoperazine preparation, 'stelazine', is now available in an additional form: 2-mg. sustained-release capsules for 'round-the-clock' effect. Available in packs of 30 and 250. (Welwyn Garden City, Herts.)

ROYAL SOCIETY OF MEDICINE

THE next meeting of the Section of General Practice will be held on Wednesday, February 15, at 8.15 p.m., when the subject for discussion will be 'The Early Diagnosis of Congenital Abnormalities'. The opening speakers will be Drs. Margaret Dudley-Brown, H. G. Farquhar and Ronald Mac Keith.

FORTHCOMING CONFERENCES

THE *Fourth International Medical and Surgical Congress*, which includes an exhibition of health and medicine, will be held in Turin from June 3 to 15, 1961. Among the many symposia to be included in the congress are those on Cardiac Surgery (June 4 to 6) and Lymphadenography (June 7). Full details may be obtained from the Secretariat of the General Committee of the Congress, *Minerva Medica*, Corso Bramante 83-85, Turin, Italy.

THE *Eighth International Congress for Microbiology*, under the auspices of the Canadian Society of Microbiologists, will be held in Montreal from August 19 to 25, 1962. Full details may be obtained from the Secretary-General of the Congress, Dr. N. E. Gibbons, National Research Council, Ottawa 2, Canada.

THE *Annual Summer School of the Central Council for Health Education* will be held at the University College of North Wales, Neuadd Reichel, Bangor, from August 15 to 25, 1961. Two two-day seminars, one on 'Mental Health' and one on 'Positive Health', will be included. Full details may be obtained from the Medical Director, Central Council for Health Education, Tavistock House North, Tavistock Square, London, W.C.1.

PRIZES

THE Council of the British Medical Association announces the endowment, by Dr. Doris Odlum, of a new prize in mental health, to be known as the *Doris Odlum Prize*. The value of the prize is £80 and it will be awarded for the first time in 1962 for 'a critical and constructive review of progress in the community care of mental disorder in the five years ending on September 30, 1961, with constructive suggestions'. Any registered medical practitioner in the British Commonwealth or Eire will be eligible to compete, and full details may be obtained from the Secretary, British Medical Association, B.M.A. House, Tavistock Square, London, W.C.1.

THE Society for Psychosomatic Research announce that through the generosity of the Sir Halley Stewart Trust a prize of £50 will be offered in 1962 for the best paper reporting original observations on a psychosomatic theme studied in patients seen in general practice. The closing date for entries is December 1, 1961. Full details may be obtained from the Secretary of the Society, 96 Portland Place, London, W.1.

THE NUFFIELD FOUNDATION

THE 15th annual report of the Nuffield Foundation shows that the sum allocated during the year ended March 31, 1960, was £1,850,000. This included a grant of £62,500 for five years for a Nuffield Unit of Clinical Physiology in the department of surgery at the Postgraduate Medical School, Hammersmith Hospital. The sum of £60,000 was allotted for the building of a Nuffield Hearing and Speech Centre. This

Centre, which will house the audiology unit of the Royal National Throat, Nose and Ear Hospital, will be the first of its kind in London. Another interesting grant is one of £5000 over two years to the Institute of Child Health, The Hospital for Sick Children, Great Ormond Street, in support of the investigation being carried out there into the relationship between biochemical abnormalities and mental retardation.

OLD PEOPLE'S WELFARE

THE National Old People's Welfare Council, in its annual report for the year ended March 31, 1960, takes stock of the changes which have occurred during the twenty years since the Council was formed. In considering recent developments, it 'regrets the increasing tendency to apply the term "problem" to the care of the elderly. To look after its older members is the responsibility of any civilized community. The care of elderly people, who in their younger years made useful contributions to society, should not be regarded as a burden or a problem but rather as a normal development which ageing is itself'. In stressing the fact that elderly men and women have preferences of their own, the report notes 'how seldom are older people consulted about their wishes and how often is it taken for granted by those organizing welfare services that they know what is best'. (National Old People's Welfare Committee, 26 Bedford Square, London, W.C.1, price *1s. 6d.*)

RECIPROCAL HEALTH ARRANGEMENTS

THE Ministry of Health announce that under legislation which came into effect on November 17, 1960, all United Kingdom citizens visiting New Zealand will be eligible for health benefits provided under the New Zealand Health Service. This Service is nearly as comprehensive as the National Health Service but excludes spectacles, some appliances, and dental services except for persons under 19 years of age.

FOOTWEAR AND TINEA PEDIS

'THE footwear that is most likely to predispose to tinea pedis is the type made from rubberized fabrics, i.e. plimsolls, baseball boots and ballerina shoes, all these types of footwear have canvas uppers which have been rubberized, or have uppers made of synthetic non-breathing materials. Imitation leather or velvet is usual. Soles are of rubber fused to the uppers with a rubber sealing strip running round the lower margin of the uppers. This type of footwear retains perspiration causing the foot to get hot and humid. The skin becomes relaxed and the pores dilated. Dirt and grit cause the skin to become abraded over pressure areas, dilated pores and the relaxed state of the skin reduces the defence mechanisms and renders infection more liable'.—Annual report of Dr. J. L. Burn, Medical Officer of Health for Salford, for 1959.

V.D. IN NEW YORK

IN the first ten months of 1960 there was a 77% increase in syphilis and a 17% increase in gonorrhœa in New York. In reporting these figures the City Health Department comments that more intensive case-finding could account for some of this increase, but a 42% rise in venereal disease in the 15- to 19-year-old group is considered to be a 'true increase'.

DIRECT MAILING

IN recommending the Canadian Pharmaceutical Association to take steps to curtail or eliminate direct mailing by its members, the Canadian Medical Association comments: 'Many advertising practices of drug houses appear wasteful and unprofessional. This applies particularly to direct mail advertising to doctors. This has reached a point where it is nothing more than a nuisance to its recipients'.

AMERICAN DOCTORS AND SMOKING

A NATIONAL survey carried out by the American Cancer Society shows that 43% of American doctors smoke cigarettes regularly, whilst 5% smoke them occasionally.

THE AMERICAN COMMON COLD

ACCORDING to a survey carried out by the U.S. Public Health Service, the annual incidence of the common cold in the United States is around 115.3 million, resulting in an annual loss of 39.5 million working days and more than 64 million days off school. In addition, 27.1 million cases of other 'acute upper respiratory conditions' are reported.

BREAST FEEDING AND MALARIA PROPHYLAXIS

A CASE is recorded by D. F. Clyde (*E. Afr. med. J.*, 1960, **37**, 659), in which a weekly dose of 25 mg. of pyrimethamine, taken regularly over a period of six months by a Bondei mother, provided complete protection for her breast-fed baby in an area of high malaria transmission, the baby receiving the drug through the mother's milk. Directly the mother stopped taking pyrimethamine the baby went down with malaria. As no other protective measures had been taken by the mother, it is concluded that 'there can be no doubt that the maternal treatment was an effective prophylaxis for the six months that the drug was being passed in her milk'.

'CAR TRAMPS'

'THERE are signs that with an ever increasing number of holiday makers visiting the South Coast generally and this town in particular, a new problem will soon arise. I refer to the practice of the few who are sleeping in cars, dormobiles and tents at various car parks, road verges and fields adjoining roadways. These people settle late in the evening and are away early in the morning, meanwhile they foul the surrounding ground leaving a potential health hazard behind them . . . If the practice increases it may be necessary for resorts to set up sites provided with sanitary, toilet and drinking water facilities where these people may continue their nomadic type of holiday without causing annoyance or danger'.—The Chief Public Health Inspector for Bognor Regis in the annual report of the Medical Officer of Health for 1959.

TRAMPOLINE INJURIES

THE latest craze to sweep over the United States is the trampoline. This consists of a large canvas mat suspended within a steel frame by rubber or metal springs, on which the trampolinist bounces. Once the prerogative of the acrobat and the gymnast, trampoline centres are now springing up like mushrooms, as a successor to the hula hoop fad. Whilst an admirable form of exercise when practised with care, it is not without its hazards. In a recent report, W. G. Ellis and his colleagues (*J. Amer. med. Ass.*, 1960, **174**, 1673) report five serious neurological accidents as a result of participation in this new 'game'. In three cases, acute flexion of the cervical spine led to quadriplegia, which proved fatal in one case. In another accident, the performer fractured his skull.

TRAFFIC ACCIDENTS IN JAPAN

MORE traffic accidents occur in the afternoon than the morning, and more on fine or cloudy days than on rainy days. These are two of the conclusions reached by Y. Uno (*Shikoku Acta med.*, 1960, **16**, 1) as a result of a survey of traffic accidents in Tokushima prefecture. Another of his findings is that 'there was a tendency that the wider the street was the more accidents occurred'.

CLAY-SHOVELLER'S FRACTURE

'CLAY-SHOVELLER'S fracture' is a fracture of the spinous process of one of the lower cervical or upper thoracic vertebræ. According to S. Kondo (*Bull. Osaka med. Sch.*, 1960, **6**, 63), it is not an uncommon condition—especially in Japan, apparently; 173 cases are said to have been reported in a period of six years. The cause of the fracture is muscular contraction, and the spinous process most commonly involved is that of the first thoracic vertebra; next in order of frequency comes that of the second thoracic vertebra, followed by that of the seventh cervical vertebra. The reason why these vertebræ are involved is said to be that their spinous processes are relatively long and thin, and the fracture occurs in the distal third. In a case reported by Kondo, in a man of 25, the fracture involved the spinous process of the first thoracic vertebra.

PUBLICATIONS

Good English for Medical Writers, by Ffrangcon Roberts, M.D., F.F.R., can be recommended without hesitation to all aspiring writers, and many established writers would learn much from its pages. A cross between Gowers and Fowler, it makes the best of both worlds, and provides the reader with the best available guide to medical writing in the English language. It is infinitely better than any of the numerous American books on the subject—largely because the author adheres to his own rules and advice with commendable consistency. The style is clear, the matter concise, and the illustrative passages (of right and wrong) to the point. This is essential reading for every member of the profession who dares to put pen to paper. (William Heinemann Medical Books Ltd., price 17*s.* 6*d.*)

Illustrating Medicine and Surgery, by Margaret McLarty, D.A., is a 'must' for anyone thinking of making a career in the world of medical illustration. An acknowledged expert, Miss McLarty also has the gift of putting over her subject. As is stated in the preface, 'only material of the widest interest and of the greatest help to the majority of workers in this field has been included', but this in itself makes the book more readable than if too many individual techniques had been covered in detail. As might be expected, illustrations are used as they should be: to explain or amplify what the author has written. In addition to intending medical illustrators, this book will be of value to authors, to teachers of medicine and surgery —in fact to anyone whose work even borders on this field. Excellently produced at a most reasonable price. (E. & S. Livingstone Ltd., price 37*s.* 6*d.*)

Medical Terminology for Radiographers, by Paul M. Davies, M.B., D.P.H., F.F.R., D.M.R., has been written to meet the 'specific needs' of student and qualified radiographers, who are 'apt to encounter difficulties in acquiring a practical knowledge of medical terminology'. It has been accepted by the Society of Radiographers for inclusion in its list of recommended

reading for students. (Wm. Heinemann Medical Books Ltd., price 15*s*.)

A Dictionary for Medical Secretaries, by Isabel Alice Stanton.—If medical terms are new to your secretary and you have no objection to her using American spellings this is the book for her. Even if she is experienced there are, doubtless, terms with which she is not familiar, and all are explained in the simplest possible way. A useful addition is a list of words which may be misunderstood either because of pronunciation or similarity to other words. The price is rather high. (Blackwell Scientific Publications, price 52*s*.)

The Office Assistant in Medical Practice, by Portia M. Frederick, and Carol Towner, in its second edition, is a valuable book because it assumes that the doctor's assistant (receptionist, secretary or nurse) needs a special combination of skills. It discusses techniques such as appointment-making, record-keeping, assisting in examination, care of instruments, but gives pride of place to right and wrong ways of dealing with people. About a quarter of the book does not fit the English scene; the remainder can be recommended to receptionists and secretaries here. They will find their work more interesting for reading it. (W. B. Saunders Co., price 37*s*.)

Clinical Medicine: The Modern Approach. By A. E. Clark-Kennedy, M.D., F.R.C.P., and C. W. Bartley, D.M., M.D., M.R.C.P.—That two hardy souls should in this day and age attempt to write a book encompassing the whole of medicine, surgery, pædiatrics, bits of gynæcology and obstetrics and all the relevant specialties for the edification of both junior medical students and postgraduates sounds like a praiseworthy but impossible feat. It is unfortunately difficult for an older physician to say how a junior student will react to the long and breathless gallop through hosts of disease conditions in some of the chapters, but even a hardened postgraduate found this hard going. Forbidding terms like kernicterus and laryngismus stridulus are introduced without any explanation, and the novice will need his dictionary at hand, and probably a textbook or two as well. Nevertheless, there are some fine pieces of synthesis of knowledge in it, as in the chapter on clinical diagnosis, and many will find valuable the sections on the inevitable ageing process, the very ill patient, and the dying man. The general idea of linking up the fragments of medicine in a consecutive narrative is good, but the attempts at compression make the narrative anything but easy. (Pitman Medical Publishing Co. Ltd., price 25*s*.)

Heart Care, edited by Morris Fishbein, M.D., is an authoritative guide by twenty experts, in non-technical language. The experts are of the cream of American cardiology, so that, although this symposium is designed for the layman, it is even more valuable to the doctor, who can read between the lines. Every aspect of heart function and dysfunction is considered in twenty outline sketches, each of which is delineated with masterly skill. In an enterprise so well integrated it is invidious to select, but two epigrams may be quoted as typical of the sanity of the whole collection: 'Avoid excesses of all kinds. but don't miss anything'; and 'The physician must understand the personality as well as the heart'. This book can be thoroughly recommended to family doctors; it contains a wealth of wisdom that is not to be found in any textbook of cardiology. (Doubleday & Co. Inc., price $2.95.)

The Urological Aspects of Bilharziasis in Rhodesia, by R. M. Honey, M.B., F.R.C.S.ED., and M. Gelfand, C.B.E., M.D., F.R.C.P.—The authors are acknowledged experts on schistosomiasis and this little book represents much careful and original work done over a period of years. It deals chiefly with the structural damage done to the urinary tract in long-standing cases of infection with *Schistosoma hæmatobium* and outlines the surgical measures available to relieve the resulting disabilities. It is an important contribution to an important subject. (E. & S. Livingstone Ltd., price 7*s*. 6*d*.)

You and Your Glands, by Peter Bishop, D.M., F.R.C.P., and *Making Friends with your Ulcer*, by Robert Kemp, M.D., M.R.C.P., are two recent additions to the useful series of booklets issued by the *Family Doctor*. (British Medical Association, price 1*s*. each.)

Noise Control in Hospitals is the report of a follow-up inquiry made during 1960 by the King Edward's Hospital Fund for London, to find out what improvements or changes had taken place since the original inquiry was made in 1957-58. Nineteen hospitals took part: nine teaching and six non-teaching hospitals in London, and four non-teaching hospitals in country towns (price 1*s*.).

Ageing, Its Changes and Promises is the report of the Tenth National Conference on the Care of the Elderly, organized by the National Old People's Welfare Council in association with the National Council for Social Service (price 5*s*.).

Lloyd-Luke (Medical Books) Ltd. announce that the 1960-61 edition of their catalogue is now available (49 Newman Street, London, W.1).

NOTES FROM THE CONTINENT

A European Newsletter

FRANCE

Neurological complications of neuroleptic drugs.—Attention is drawn by J. Sigwald and his colleagues to the fact that all the neuroleptic drugs, including the phenothiazine and rauwolfia derivatives, can produce a clinical picture characterized by features typical of involvement of the extrapyramidal tracts. Thus the patient may develop tremor, a mask-like expression, slowness of speech, diminution of the normal movements of hands during conversation, and difficulty in writing. In others, manifestations typical of the sequelæ of encephalitis lethargica, such as oculogyric crises, may occur. The onset of these symptoms is usually insidious, but occasionally it may be more acute. There is no correlation between the onset of these side-effects and either the age of the patient or the condition for which the drug is being prescribed. Attention is drawn to the curious anomaly that, although these drugs may produce many of the manifestations of Parkinsonism, they are sometimes of value in the treatment of this condition.

Although the development of these Parkinsonism manifestations seldom calls for any interference with the drug being prescribed—and, indeed, some psychiatrists look upon them as a favourable therapeutic sign—it is recommended that, should they become troublesome, they be treated with anti-Parkinsonism drugs or sedatives. Should their onset be acute, the recommended form of treatment is 25 mg. of promethazine intramuscularly.

'Chronic constitutional tetany'.—According to H. P. Klotz, the most common form of chronic tetany is the so-called idiopathic chronic constitutional tetany. It is said to be a familial condition and to be characterized by long latent phases. Precipitating factors include pregnancy, abnormal loss of calcium from the intestinal tract and—most commonly—psychogenic upsets. Not only is the total serum calcium within normal limits, but so also are the ionized calcium, the blood phosphorus and potassium and the alkali reserve. In spite of the apparently normal serum calcium, the attacks of tetany respond to the standard treatment: e.g. vitamin D_2. The author now reports experiments with calcium-45, which are said to explain these anomalous findings. The experiments revealed what is described as a decrease in the 'calcium pool' of the body, mainly due to a lowering of the cellular calcium. In addition, there is said to be an associated delay in the onset of any temporary hypocalcæmia—which is attributed to a 'weakness of the neuro-parathyroid connecting system'. It is reported that in 11 out of 12 cases treated with calcium-45 there was an improvement in the 'calcium pool', with a reversion to normal figures in most cases.

In view of the liability of attacks to be induced by psychogenic disturbances, it is recommended that treatment with vitamin D_2 be supplemented by psychotherapy.

Mucoviscidosis and chronic lung disease.—The discovery of the characteristically high sodium and chloride content of the sweat in fibrocystic disease of the pancreas (or mucoviscidosis as it is now more generally known)—higher than in any other condition except Addison's disease—has emphasized the protean nature of the disease and shown various manifestations of it—including chronic lung disease and peptic ulcer—to be fairly common in adults. According to E. Bernard and his colleagues, the use of this test has revealed that the condition occurs in 1 in every thousand babies born, and a positive result is obtained in 20% of the relatives of affected infants.

Approaching the problem from the opposite angle, they have investigated the sodium and chloride content of the sweat of 31 patients with chronic bronchial disease, and 39 controls consisting of patients with asthma and pulmonary tuberculosis. The results showed that abnormal findings were obtained in eight of the patients with chronic bronchial disease, but not a single one of the controls. It is therefore suggested that mucoviscidosis must now be considered in the differential diagnosis of primary chronic bronchial disease.

ITALY

An antibody in leukæmic children.—According to M. Gomirato and his colleagues, it is possible to isolate from the blood of children with lymphatic leukæmia an 'entity' which agglutinates the red blood cells of chickens. This 'entity', which can be cultivated, though with difficulty, in the chick embryo, has the characteristic of virus hæmagglutinins of producing a spontaneous non-reversible hæmagglutination. It has only been isolated from children with lymphatic leukæmia. Most of the leukæmic children examined possessed specific antibodies to this 'entity'—at varying concentrations (usually low) and varying from time to time, but they have

never been found in non-leukæmic children. The 'viral entity' is inhibited in its hæmagglutinating properties, not only by the serum of the leukæmic child from whom it is obtained, but also by the sera of all other leukæmic children. Finally, it is reported that it is distinct, and easily distinguished, from all other known hæmagglutinating viruses.

Treatment of influenza.—Details are given by B. Sisti of a clinical trial of 'xénalamine', which is described as a 'new synthetic antiviral' preparation, in an epidemic of influenza due to virus A. It is reported that in those treated with this preparation both the severity and the duration of the infection (as judged by the duration of pyrexia) were less than in those treated by other methods. So far as prophylaxis was concerned, no case of influenza occurred among 40 children treated with 'xénalamine' for twenty days, whilst in the same period 36 cases occurred among 65 children (55%) who did not receive the drug.

A new drug for neurological diseases.—Another clinical trial is reported by V. Bergamini and P. Baggiore—of what is described as a new alkaloid named 'nivaline' in 23 cases of progressive muscular dystrophy, six cases of myasthenia gravis, nine cases of 'muscular atrophy of medullary origin' and eight cases of multiple sclerosis. 'Nivaline' is said to act as an anticholinesterase less powerful than, but also less toxic than, prostigmine, and its clinical effect is attributed to this. In 17% of the cases of progressive muscular dystrophy it had a favourable objective effect demonstrated electromyographically, with an appreciable improvement of muscular function; this, however, was only transitory. In 31% of cases there was subjective improvement, whilst in 52% there was no improvement at all. There was some improvement, but transitory, in 45% of the cases of muscular atrophy, whilst the antimyasthenic effect was less than that obtained with prostigmine. No effect was noted in any of the cases of multiple sclerosis.

A new treatment for myocardial infarction and arterial disease.—The favourable results obtained from the use of what is described as 'a special extract of hæmolysed and deproteinized blood' in cases of varicose ulcer and peptic ulcer led T. Lubich and G. Civiero to investigate its effect in 30 cases of recent myocardial infarction, 25 cases of sclerotic arteriopathy, and two cases of Buerger's disease. The rationale of the treatment is that such a product increases the absorption of oxygen and thereby improves cellular respiration; this it is said to do more effectively than other activators such as adenosinetriphosphate.

In the cases of myocardial infarction, such treatment is said to have been followed by a more rapid disappearance of symptoms and more favourable progress than in patients treated by other means. In addition, no side-effects were encountered. Even more satisfactory results are claimed in the cases of arteriopathy, in which the clinical objective and subjective improvement was confirmed by oscillometric measurements.

Intra-arterial therapy for varicose ulcer dermatitis.—The intra-arterial injection of a combination of an antibiotic (penicillin or chloramphenicol), 1% procaine and 100 mg. of pyridoxine is recommended by R. Degrassi for the treatment of the skin complications associated with varicose ulcer or any other vascular abnormality in the lower limb. The intra-arterial injection of pyridoxine is said to have a much more potent action on the ulcer than intravenous administration. Such treatment, it is suggested, should be considered in all cases of chronic ulceration which are not responding well to other forms of treatment. It should, of course, be supplemented by local treatment and the usual general measures for the alleviation of varicose ulcer or whatever other underlying vascular condition may be responsible for the dermatological lesion.

Virus interference.—An interesting clinical experiment is reported by G. D'Alessandre and his colleagues. To five children aged 1 to 2 years, in a 'community' of children characterized by a high incidence of intestinal infection with ECHO, Coxsackie and poliomyelitis viruses, they administered an attenuated LSc strain (Sabin) of type 1 poliomyelitis virus. A careful watch was then kept on these children and 57 contacts, by means of rectal and pharyngeal swabs to determine the incidence of intestinal viruses, and by means of periodic measurements of poliomyelitis antibodies. These investigations were all negative. In other words, no infection was produced by the administered virus in either the five children or their contacts. This is attributed to interference by the viruses already present in the intestines. In 270 of the 390 rectal and pharyngeal swabs (i.e. 69%), five types of ECHO virus, one of Coxsackie virus, and type 3 poliovirus were isolated.

'Notes from the Continent' are produced in collaboration with the Editors of *Bruxelles Médical* (Belgium), *Le Concours Médical* (France), *Münchener Medizinische Wochenschrift* (Germany), and *Minerva Medica* (Italy).

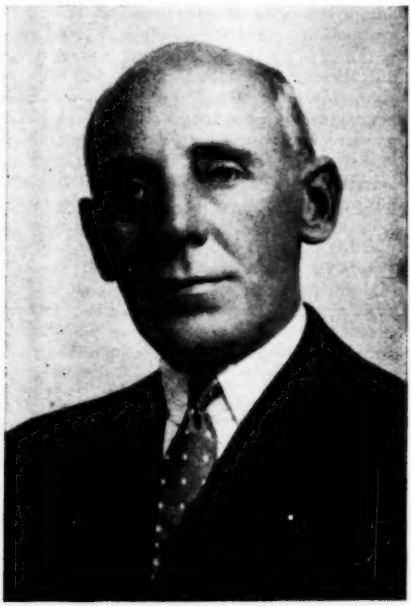
THE PRACTITIONER

Fifty Years Ago

'He that sleeps feels not the toothache'—William Shakespeare: *Cymbeline*, IV, iv, 176.

FEBRUARY 1911

'I HAVE often thought of late that the family doctor and many operating surgeons are not as hopeful as they might be in regard to the prospects of relief of those afflicted with cancer of the large intestine', writes Arthur E. Barker, F.R.C.S., Surgeon to University College Hospital and Consulting Surgeon to the Queen



Leonard Ralph Braithwaite, M.B., Ch.B., F.R.C.S. (1878-1942)

Alexandra Military Hospital, Millbank, in 'The improved diagnosis of, and the consequently more hopeful aspects of the surgery of, cancer of the large intestine'. In his concluding paragraph he acknowledges that in many cases 'we may be forced to take palliative measures or even to face the sad conclusion that nothing can be done. But such cases are becoming rarer . . . and with every advance in diagnosis we are justified in hoping for better days still'.

A. W. Russell, M.B., Obstetrical Physician to the Glasgow Maternity and Women's Hospital; Surgeon to the Royal Samaritan Hospital for Women; President of the Glasgow Obstetrical and Gynæcological Society, writes on 'Extraperitoneal Cæsarean section and its scope in modern obstetric surgery'. He summarizes the history of the operation, and declares that in cases in which application of forceps has led to serious infection, 'the ordinary method of Cæsarean section is contraindicated'. In these circumstances the advisability of using extra-peritoneal methods must be considered 'in order to avoid or lessen the risk to the mother, while everything is done to save the life of the child'.

E. Canny Ryall, F.R.C.S., Late Surgical Registrar, Westminster Hospital, etc., writing on 'The indications and contraindications for the use of spinal anæsthesia', alludes to the world-wide reputation of British anæsthetists for the administration of general anæsthetics, but adds: 'Spinal and local anæsthesia in all their forms have not received the attention in this country which their importance merits . . . their many advantages cannot any longer be overlooked, but unless we are to remain years behind other countries steps must be taken at once to teach and popularize them'.

'During the whole time I have used cocaine', writes L. R. Braithwaite, M.B., Ch.B., F.R.C.S., Honorary Assistant Surgeon, Leeds Infirmary, 'I have never seen a single case with any symptoms of poisoning, except on one occasion when I injected, by mistake, a 10 per cent. solution into a man's finger; an attack of tachycardia followed, but the man subsequently recovered'.

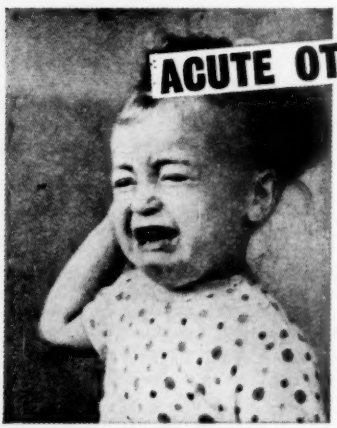
Born in Halifax, Leonard Ralph Braithwaite studied medicine at Leeds, where he graduated with first-class honours in 1903. After holding house appointments at the General Infirmary, he became assistant surgeon in 1909, and in the following year private assistant to Berkeley Moynihan. As an operator he had much of the skill of his preceptor. Appointed surgeon with charge of outpatients in 1919, he became full surgeon in 1924. During the 1914-18 War he was Moynihan's assistant in France, served at the Second Northern General Hospital, Leeds, and accompanied the Mediterranean Expeditionary Force to Salonika. Braithwaite was a fine general surgeon who specialized in abdominal work. It was said of him: 'As in the fingers of his master, the ⅜ circle intestinal needle was a beautiful tool in his skilful hands'.

Interested in 'bilification' and the flow of lymph from the ileocæcal angle, and its possible bearing on the cause of duodenal and gastric ulcer, the Bradshaw lecture he delivered shortly before his death dealt with the role of bile in chronic duodenal regurgitation. A Vice-President of the Royal College of Surgeons of England, he was Moynihan lecturer and Arris and Gale lecturer. A good teacher, he was clear and precise, and sometimes blunt in speech. He was a keen art collector and a man with many interests. At the time of his death in 1942 he was Emeritus Professor of Clinical Surgery at the University of Leeds.

Braithwaite's article on 'Cocaine anæsthesia in minor surgery' is followed by one 'On the administration of anæsthetics on the open mask', by William Rankin, M.A., M.B., Ch.B., Extra Dispensary Surgeon to the Western Infirmary of Glasgow; Extra Honorary Surgeon to the Royal Hospital for Sick Children, Glasgow. 'Whatever may be the opinions held as to the most scientific and safest method of producing anæsthesia . . . there is little doubt that the administration of chloroform, either alone or combined with ether, or A.C.E. mixture on some form of open mask, will continue to be the practice of the majority of those who have had their training in the Scotch schools till the discovery of some safer anæsthetic, as convenient as chloroform, and as capable of being administered in an equally simple manner'.

'Neuro-retinitis in anæmia', writes R. Beatson Hird, M.D., F.R.C.S.Ed., Hon. Ophthalmic Surgeon, Birmingham Lying-in Charity Maternity Hospital, etc., should be treated by the liberal administration of iron, and a diet including raw beef sandwiches, with bed rest in the early stages. 'It is because of the brilliant results achieved by the treatment in these cases that I consider we are justified in our belief in anæmia being the cause, and an early application of the treatment enables us to give a good prognosis'.

Strong measures are recommended by Archibald R. Douglas, L.R.C.P., L.R.C.S., Medical Superintendent, Royal Albert Institution, Lancaster, in his article on 'The Ament'. 'How, therefore, may improved conditions be secured?' he asks. 'First and foremost by some system of restriction of marriage to those who are mentally and physically fit to take upon themselves the responsibilities and to intelligently discharge the duties of parentage . . . Next in importance come the segregation for life of the imbecile; the prohibition of marriage for those who have become insane; no marriage for the cured consumptive except the better types; and where imbeciles have appeared in sibship, marriage to be refused to all other members of that sibship . . . The married who have become insane to have no more children. When a defective child has appeared in a family . . . the authority to warn the parents that there must be no more children. As a woman, once she passes the age of her maximum fertility, soon tends to become barren, and if she does become pregnant to bear inferior children, it might be advisable to fix an age beyond which marriage should not be allowed'. T. H. B.



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